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ILLUSTRATIONS

A Nineteenth-century Attempt at a Large Cathedral. View from North-west.—Mr. A. H. Skipworth, Architect ..... *Double-Page Ink-Photo.*
A Nineteenth-century Attempt at a Large Cathedral. North Elevation and Plan.—Mr. A. H. Skipworth, Architect ..... *Double-Page Ink-Photo.*
Abbey Gate, Bury St. Edmunds; Norman Tower, Bury St. Edmunds ..... *Two Single-Page Ink-Photo's.*
A Street Front.—Mr. R. W. Bedingfield, A.R.I.B.A., Architect ..... *Double-Page Photo-Litho.*

Blocks in Text.

Wall Paper designed for Messrs. Hayward & Son, by Mr. John Belcher, Architect Page 202
Wall Paper designed for Messrs. Hayward & Son, by Mr. Beresford Pite, Architect ..... Page 203
Memorial Tablet in Preston Free Library. Mr. E. Roscoe Mullins, Architect ..... Page 205
Cross in Cemetery of Teampuil Brecan, Aranmore ..... Page 206

CONTENTS.

What Should be the Type of a Modern Cathedral? 197
A County Surveyor on Highways 198
Notes 199
The British Association 201
Wall-paper Designs 202
The Influence of Poetry on Architectural Development 202
Memorial to the late C. R. Jacson 204
Competitions 204
Architectural Societies 204
Diatomite 205
A Nineteenth Century Attempt at a Large Cathedral 205
Abbey Gateway and the Norman Tower, Bury St. Edmund's 205
A Street Front 206
Trade Catalogues, &c. 206
Cross in Cemetery of Teampull Brecan, Aranmore 209
Iron and Concrete Floors 206
The London Building Trades Federation 206
Institution for Builders' Clerks 206
Student's Column: Metals used in Building.—XII. 207
General Building News 207
Sanitary and Engineering News 209
Stained Glass and Decoration 209
Foreign and Colonial 209
Miscellaneous 209
Capital and Labour 209
Meetings 210
Recent Patents 210
Some Recent Sales 211
Prices Current of Materials 211
Tenders 211

What Should be the Type of a Modern Cathedral?

WHETHER there is any probability of a sufficient number of chances for architects to show what they can do in the design of a modern cathedral, to make it practically worth while to consider the subject, is perhaps a question to be asked. But we do not know what turn things may take in this respect. There is a great deal of awakening and reviving of ecclesiastical enthusiasm in the present day; the Church has regained a hold on the national sympathy which fifty years ago would hardly have been supposed possible; the church-going population is on the increase; bishoprics are being proportionally multiplied, while at the same time the perception that a grand building, whether for secular or sacred purposes, is a thing worth having and spending money upon, is getting an increasing hold on the mind of the nation. Even in the matter of parish churches we can discern a tendency to aim at the creation of finer and ampler structures than our predecessors of a generation or two back would have thought of. Such a building as the late Mr. Sedding's church in Sloane-street, almost like a small cathedral in scale, and with the provision at least for a most sumptuous scheme of decoration, would have been a phenomenon in the earlier part of this century. We have, it is true, only one modern cathedral planned on true cathedral scale, commenced in the present generation, and that is at present only half built, though the design for it is complete. But we have had a good many cathedral designs produced of late years. There is the design for the new Roman Catholic Cathedral at Westminster, still in a somewhat sketchy state, but conceived on a great scale, and possibly destined to be carried out sooner than some people expect. There is the Roman Catholic Oratory Church at Brompton, too, now nearly complete, and which, in an architectural sense, is really a second-class cathedral. We had three great designs for the Liverpool Cathedral produced nine years ago; designs on the largest scale and worked out in the fullest detail. And we have the pleasure of publishing in the present number a study for a nineteenth-century cathedral on the largest scale, by a talented young architect who has evolved a treatment of church architecture characterised by a great deal of originality. It is evident, at all events, that architects are turning their attention to the subject, as one in connexion with which there are possible chances in store for them. The Liverpool Cathedral project failed for lack of funds; but there may have been special reasons for that arising out of the jealousies of opposing parties; it does not follow that the scheme is shelved permanently. We may consider a new cathedral or two, therefore, as a possible event in due time. And it is an interesting question, supposing a new cathedral were to be commissioned, and sufficient funds for it forthcoming, what, in an architectural sense, ought we to endeavour to do with it?

The question has a two-fold aspect; that of plan, and that of architectural style and treatment; not, of course, that these can be considered entirely independently, but the question of plan would be to a considerable extent governed by considerations not purely architectural. The form to be assumed by the plan would depend a good deal on the manner in which the function of the building was regarded; whether it was to be a revival of the Mediæval cathedral, or a building specially designed to meet the altered feelings and requirements of the church of the nineteenth century.

For the present purpose we may put the consideration of a Roman Catholic cathedral on one side. It is true that we read a few days ago in the daily papers that the Pope is possessed by very hopeful ideas as to the return of the English church into communion with Rome; and it is certainly curious that an idea which a generation ago would have been received with derision and with shrieks of "No Popery," should be even so much as discussed in English newspapers without provoking any special comment or demonstration. It is not our business to express any opinion as to the advisability or possibility, on theological grounds, of such a reunion: all we are called upon to say is, that we think it highly improbable, and that on that ground we may dismiss that side of the subject, and consider only the requirements of a Protestant Cathedral for modern England. The two problems are quite distinct, for the Church of Rome being essentially conservative, and bound to ancient precedent, both the plan and architectural type of a Roman Catholic Cathedral would naturally assume a form dictated by precedent, either Mediæval or pre-Mediæval. A Protestant Cathedral is not necessarily bound to any such type; and as in fact the English Church at the present day is a perfectly different kind of institution from that under which and for which our ancient Cathedrals, the places of worship of a monastic order, were designed, it seems really almost a matter of logic that we should throw over the Mediæval type of cathedral plan, and consider whether we could not produce a plan more specially suited to the object of modern worship in a great church.

This, however, so far, modern architects seem to have been very unwilling to do. Truro Cathedral, indeed, although externally it proclaims itself as nineteenth-century Gothic, and exhibits a certain character of design peculiar to its architect, might be described as being internally even more Mediæval than the Mediæval cathedrals themselves, every pains having been taken to suggest the idea that it was built in the thirteenth-century. All the Liverpool cathedral designs adopted the long nave and transepts of the Mediæval cathedral, and Mr. Skipworth adopts it also in his plan. Now, no one wants (or ought to want) a merely utilitarian plan for a cathedral; the erection of such a building is an opportunity for soaring above utilitarianism. But the general plan certainly ought to be, in the main, in conformity with the modern use of a cathedral, and from this point of view the long Mediæval nave is entirely out of place. A modern cathedral may be considered to have a double use for worship; either as a place of service for a moderate number of worshippers in the choir, on ordinary occasions, or for a great congregation in the nave (or some equivalent of the nave) on other occasions; and, in fact, it is being more and more felt that the great use of a cathedral in modern life is for the latter purpose; a place of worship for great congregations. For this purpose an open area is required, not a long avenue. Mr. Skipworth endeavours to give a more utilitarian appearance to his nave by adopting the one-aisle arrangement, with a narrow aisle for passage only at the sides, but this does not make it an effective congregational nave; while its architectural beauty, which is really the only defence of the long nave in a modern cathedral, is very much diminished by this treatment, which is much more suited to a church of ordinary size, where it has a real practical use. A vaulted nave nearly 100 ft. wide between the piers is rather a

serious affair constructively, and as it can only be, judging by the elevation height, about 150 ft. to the crown of the vault, with all this height it would appear disproportionately wide. In the Liverpool Cathedral designs,* both Messrs. Bodley and Garner and Mr. Emerson appear to have felt that a wide area at the crossing at any rate was desirable in a modern cathedral, and both expanded their plans into an octagon at this point, Mr. Emerson's plan being apparently based upon St. Paul's and Messrs. Bodley and Garner's on Ely. This, however, does not prevent their long naves being anachronisms; the octagon crossing is only a halfway step, but it has no doubt the architectural advantage of getting rid of what Fergusson rightly characterised as the bathos of the Gothic church—the narrow square opening under the central tower. It is the same perception evidently which has led Mr. Skipworth to expand the centre of his design into a great dominating mass, giving far more power to the centre than is obtained by the narrow Mediæval tower; his treatment of this portion is very striking, and is the finest point in his design.

But all this does not give us what we really want in a modern cathedral plan. We want a choir for the ordinary daily service of the cathedral, and a wide space for the large congregational service, and we want to keep them close together and in relation with one another. There are three types of plan which might answer this purpose. There is that of Wren's first design for St. Paul's, a grand conception, defective in some of its details, which might very well be taken up, if an opportunity offered, and treated anew with better detail. Then there is the magnificent plan and general conception of St. Sophia, perhaps the finest building ever erected as a Christian church. And here, too, there would be a great opportunity offered to the modern architect, of combining this splendid type of interior design with an equally fine and effective exterior, the lack of which is the one great defect of St. Sophia. There is a third type suggested by that remarkable church, St. Gereon at Cologne; the long choir with the elliptical nave; a plan which would be exceedingly suitable for a modern cathedral, and which affords a splendid opportunity for architectural effect.

In his plan Mr. Skipworth has suggested an interesting modification by introducing a small cloister, not in the usual Mediæval position, but abutting against the south wall of the choir, and giving access to a chapter-house at the south-east angle. This is both picturesque and convenient, giving the cloister a use as the means of passage for the clergy from the choir to the chapter-house; whereas a cloister adjoining the nave, in the usual place, would have been a mere archaism, of no use at all. We fear it can hardly be considered equally defensible to insert a Lady Chapel east of the choir. We do not at all events pay divine honours to the Virgin now, and therefore a Lady Chapel is an anachronism.

The question of style for a modern cathedral is an even more difficult one than that of plan, since it cannot be directly settled or influenced by the practical considerations which would at all events have considerable weight in determining the nature of the plan. The form of plan adopted would, however, no doubt to some extent suggest the nature of the architectural treatment most proper. It is not of course surprising that in the Liverpool cathedral designs the two architects who adopted a completely Mediæval plan, Mr. Brooks and Messrs. Bodley and Garner, also adopted a Mediæval design; that of Mr. Brooks being distinguished however from genuine Mediæval work, like Mr. Pearson's exterior design of Truro, by the special character of the architect's own handling, which in each case, though entirely founded on Mediæval work, is quite distinguishable from it. Mr. Emerson alone, among the Liverpool competitors, adopted a really novel architectural treatment, showing a somewhat Classic outline and general effect combined with a detailed treatment based on Early Gothic, and adapting the dome as a Gothic feature. Mr. Skipworth has expanded into a large cathedral a manner of treatment which he may be said to have invented for himself, and which he has already elaborated in some very charming and original designs for churches; a style in which details derived from Gothic are treated with a certain degree of Renaissance feeling, and which is in fact one of the natural results of the prevalent feeling at the present moment for a rather free mixture of the elements of Classic and Gothic detail, though in Mr. Skipworth's work the Gothic predominates very much. In the small churches which he has designed this style appears charming; but we question whether it is not too delicate, light, and deficient in breadth and power when made use of for the architectural expression of a great cathedral. The defect of his cathedral design seems to us to be that it wants scale, and does not produce in perspective the impression of being so large a building as the geometrical elevation to scale shows it to be. No one looking at the perspective view would imagine that the towers which flank the west front are 300 ft. high to the apex of the spires; they do not give the impression of more than half that height, if even that. Even the traceried windows as shown in the elevation do not act as a sufficient corrective; no one looking at the elevation would guess the main side windows of the nave to be twenty feet across, without reference to the scale. In fact, the scale on the drawing ought to be reduced at least one-third, if not one-half, to fit the character of the design, which in other respects contains a great deal that is very charming. But we do not think it is the style for a cathedral. It is too pretty for that, and wants breadth and mass.

Nor would the elegancies of even the best varieties of "free classic" now practised be a suitable architectural dress for a great cathedral. Charming for house-fronts, and even for town-halls, this is a style in which grace and elegance rather than grandeur is to be expressed.

No; if a chance should yet arise for a great modern Protestant cathedral to be built in this country, there is something more to be done with it than the forms of architectural design just at present most in fashion will supply. We should break away both from the current fashions of the present moment in regard to design, and from the influence of Mediævalism in regard to plan. We should have a cathedral with a great domed central space, with a sufficient *avant-corps* to form a grand vestibule or approach to it, and a ritual choir opening out of it eastwards. And it is possible that we might find, in either the graver Classic style of the Renaissance, or in the suggestions of Byzantine architecture, the finest motive, not for an imitative Classic or Byzantine cathedral, but for something founded on either of those styles, but treated in a modern spirit. We have three great examples before us, all of them imperfect in one way or another. We have St. Sophia, with a glorious interior but a bad exterior. We have Michelangelo's St. Peter's (without the subsequently lengthened nave which destroyed its balance). but with the mistake of the employment of a colossal order which destroys the scale, and of misapplication of windows in stories which have no existence in the structure itself. St. Sophia with a grand exterior treatment; St. Peter's without its faults of scale and detail; Wren's conception of a Greek cross cathedral, without Wren's weak and commonplace detail: these would surely be objects better worth aiming at, in case of the chance for a new cathedral, than the repetition of a Mediæval plan and design evolved under circumstances quite different from those under which a modern Protestant cathedral would be erected. Nor must we forget, either, the type suggested by St. Gereon; a single experiment of the greatest originality and suggestiveness, which might well bear further development. It is to be hoped English architects may yet have a chance of producing a great cathedral on one or other of these types.

* Full illustrations of the three Liverpool designs will be found in our volume for the first half (January to June) of 1886.

A COUNTY SURVEYOR ON HIGHWAYS.

IMMEDIATELY prior to the passing of the Local Government Act, 1888, three-fourths of the cost of maintenance of the main roads throughout the county was contributed, one-half by the county authority, and one-quarter by the Imperial Exchequer. The county authority (then the Court of Quarter Sessions) had no direct administrative power over the main roads beyond that of withholding the grant when the roads were not maintained to the satisfaction of their surveyor, as shown by his certificate. It appears that the main roads in Nottinghamshire were managed as follows:—

	Miles.	Furlongs.
By 4 highway boards	120	4
By 90 parishes	146	7
By urban authorities	54	0

Under this multiplicity of, for the most part, unskilled management anything like uniformity was impossible. "On one road, twelve miles in length, could be found as many as ten different attempts at road-making, with ten different results." It is not surprising, therefore, that the Notts County Council took an early opportunity of availing themselves of the powers conferred upon them by the Local Government Act, 1888, and took over the entire management and maintenance of the rural main roads within their area.

We do not purpose entering into the vexed question of the efficiency or economy of direct county management as a general principle, but in the present case we may say that the system appears to have worked satisfactorily. The Notts County Council had favourable opportunities for striking out a new line, and full advantage was taken of them by the introduction of the elaborate system now at work, which was evolved under their direction by their Surveyor, Mr. E. P. Hooley. We are disposed to congratulate the Notts County Council upon the grasp of the situation which they evidently showed in obtaining the services of a practised and zealous road engineer instead of continuing the custom of appointing an architect to superintend work of this kind, which requires so much special experience and knowledge to carry it out satisfactorily.

One of the principal effects of the Local Government Act 1894, was to transfer the duties of maintenance of rural roads to the District Councils within whose area they lay. The Rural District Councils of Notts have, therefore, in a less degree, been placed, with regard to the rural roads, in much the same position that the County Council were a few years earlier with regard to the main roads. With a view to assisting the newly elected District Councils, a conference was held at Nottingham in May, 1895, under the presidency of Lord Belper, Chairman of the Notts County Council, and of Colonel H. Denison, R.E., Chairman of the Highways and Bridges Committee, at which the County Surveyor, Mr. E. P. Hooley, read a paper describing the system of management devised and adopted by the Council. In response to the unanimously expressed wish of the delegates present at the Conference, this paper has now been published.* In the course of it the method of keeping the accounts connected with the main roads is

* "Management of Highways." By E. Purnell Hooley, A.M.Inst.C.E., County Surveyor of Nottingham. London: Biggs & Co. 1895.

explained, and specimens of the wages sheets and the various books in use are given. The system of accounts is very complete, admitting of easy and accurate checking, and will doubtless form a useful guide for the new District Councils. It involves, however, an amount of clerical work which is rarely to be expected from a Surveyor to a District Council, especially when that officer has to perform the sanitary as well as the highway work. It is not every surveyor who has at his command the services of "two writing clerks." It must also be remembered that methods which are necessary for the effectual working of a large district are frequently unnecessary, and even prejudicial, in a small one. Nottinghamshire is, no doubt, a very enlightened county, and the labourers found there have probably profited by the advance in education, but we venture to think that too much is expected in the way of literary effort from the class from which the best road-labourers are usually drawn. It is a decided disadvantage to a system that it should exclude skilled labour in all cases where the labourer cannot "write a report."

The author proceeds in a practical manner to comment upon the processes usual in road maintenance. He emphasises the saving of materials which may frequently be attained by an intelligent application of manual labour. We must here enter a protest against the absurd practice of fixing the proportion which the total cost of manual labour shall bear to the cost of materials. In the same district the cost of materials may vary to the extent of hundreds per cent., the quality being the same, and the rate of wages not varying. How then can any assigned proportion be true except within very limited areas? Our own opinion is that it is both misleading and useless.

We cannot endorse Mr. Hooley's assertion that "machine-scraping should never, under any circumstances, be allowed." If employed properly, and with judgment, it is much more economical than it is damaging, especially with certain descriptions of materials. With regard to materials, Mr. Hooley says that each ton should spread nearly 20 yards one stone thick. This "one stone thick" is a rather vague definition, and Mr. Hooley will confer a benefit upon the students of the literature of road-maintenance by explaining exactly what he means by the expression. Mr. Hooley's definition of a "decently-formed road," viz., "a road with 6 in. of metalling on it" will be generally admitted as extravagant, and would produce a thrill of horror in most highway authorities who are charged with the maintenance of rural district roads, and who have the interests of the ratepayers at heart.

"Materials," says Mr. Hooley, "should never be applied more than two stones thick at one time." Taking this statement in conjunction with the area that can be covered by a ton of material "one stone thick," given above, this limit of thickness should only be approached where a steam-roller is in use, and would never do where the materials are to be consolidated by the traffic alone.

Regarding the economy of coating a road with the assistance of a steam-roller in summer as compared with winter, Mr. Hooley states that "the only extra expense (in the former case) arises from more watering being required; but inasmuch as watering is required at all times, the water is only about half another horse's time." In the remarks which follow, Mr. Hooley apparently overlooks the long distances which water has frequently to be hauled in rural districts in summer-time, on account of the drying up of sources of supply available during the wet seasons.

In calculating the working expenses of the steam-roller, Mr. Hooley states that a charge should be invariably included of 10 per cent. for depreciation, an allowance which may be accepted as correct for general purposes; and he estimates the average life and work of a roller as amounting to about 30,000 tons of material consolidated. The Notts steam-rollers, which are employed all the year round, consolidate between thirty and forty tons of material per day, according to traffic, &c.

Some very useful forms of contract and agreement, and specimens of by-laws, together with accounts and details of expenditure, are given at the end of the book, from which in other respects much valuable information may be obtained, though the conclusions set forth in it must be followed with discrimination.

NOTES.

IN a letter addressed to a daily contemporary, and signed "A Grandson of Thomas Papworth," the writer of the letter avers that the screen in front of the Admiralty, at Whitehall,

"Was designed and executed by Thomas Papworth, and I have heard my late father say that he was never paid for the work."

In the account of Thomas Papworth (1775-1847), contributed to the "Dictionary of Architecture," by Professor Donaldson, Wyatt Papworth (his son), and another jointly, we find no mention of this. In that same work we read, *s.n.* Robert Adam (1728-92):—

"The screen in front of the Admiralty dates from this year [1760]."

In Wyatt Papworth's edition (1881) of Gwilt's "Encyclopædia of Architecture," page 222, is this passage:—

"Ripley, it must be confessed, failed at the Admiralty, which was afterwards veiled by Mr. Adam's beautiful screen, since cruelly 'cheated of its fair proportions' by the late architect to that Board, in order to make two coach entrances, which might, by the exercise of a little ingenuity, have been managed without defacing the design."

The screen as originally designed, with ten columns and one (a central) gateway only, appears in the print by Medland, after Miller, published in 1796 by Colnaghi & Co., and bearing Earl Spencer's coat-of-arms at foot. Perhaps the additional coach entrances were made by Thomas Papworth; yet we have failed to discover that he was at any time Architect to the Admiralty. The dates we cite above do not support his grandson's statement, as they tend to show that the screen was built fifteen years before Thomas Papworth was born, and about the time when Robert Adam began his career of practice with his brother James. Moreover, in Part IV. of "The Works in Architecture of Robert and James Adam, Esquires," 3 vols. fo. 1773-1822, is D. Cunego's plate, 1775, inscribed: "View of Part of Whitehall, Shewing the Admiralty Office, with the New Gateway [the screen, with one gateway] designed & executed in the year 1760." We observe that the writer of the letter in question repeats the common blunder of writing the architect's name "Adams" instead of "Adam."

A CORRESPONDENT of the *Times*, under the signature "Citizen," draws attention to a resolution of the Corporation of Rochester to repair the south-west turret of Rochester Castle. He complains that they have already repaired the north turret and restored it "in new stone with sharp edges," and that the ancient rugged appearance of the tower is entirely destroyed, and urges that the Corporation should be prevented from doing anything more to the tower. We have not seen the new work referred to; but if it is necessary for the security of the structure to rebuild a portion of the turrets, we certainly should be in favour of it being done as new work, not with any effort to make it look old. The real question would be whether it was absolutely necessary to rebuild the portions referred to at all; whether they could not have been made secure without actual rebuilding.

IN the annual report of the Borough Engineer of West Ham we find, under the head of "House Drainage," a grave complaint as to the effect on the borough of a certain recent decision of the Queen's Bench Division in regard to combined house drains. The report says:—

"The effect of the new interpretation of the Act is very largely to convert 'combined' back drains into public sewers, although on private premises, and thus relieve owners of the responsibility of their maintenance and place it upon the Sanitary Authority. In the Borough of West Ham this means the conversion of many miles of private drains, good, bad, or indifferent, into public sewers. It is estimated that nearly three times the length of the street sewers are thus thrown on the Corporation. Very much of the private drainage was laid many years ago in marsh lands, and by 'jerry builders,' without sufficient supervision. The previous practice has been to serve notices upon owners to rectify defects, but now the Medical Officer serves notice on the Borough Engineer to reconstruct such defective works. It is a very serious matter to have the responsibility of some 300 miles of imperfect private drains thrown on the rates."

The position is no doubt an unfortunate one at present for the borough of West Ham, inasmuch as they are compelled to make good out of the rates defects of drainage which have arisen from the neglect of drains which hitherto have been, in a legal sense, private drains. But is not the surveyor's complaint as to the state in which these drains now are, and the expense entailed in getting them into proper order, in itself an indication that they ought to have been in the hands of the public authorities all along? That any drain into which the drainage of more than one habitation is taken should be regarded as a public sewer and be under the direct responsibility of the public authorities appears to be by far the safer course. It may bear hardly on the Corporation of West Ham in the present instance, although, seeing that, by their own showing, they have always had power to serve notices on owners to remedy defects, it would appear that the bad condition of these drains, of which Mr. Angell complains, is indirectly the fault of the Corporation themselves.

THIS is the season of the issue of vestry reports. The thirty-ninth Report of the Vestry of Chelsea, for 1894-5, chronicles among other matters the installation of electric lighting in the large hall, the Council Chamber, and other rooms on the ground-floor of the municipal offices. The account of the steps taken by the Vestry to obtain a reduction in the price of gas to private consumers is worth note, as showing that a firm attitude towards gas companies may bring its own reward. Early in the year 1892, the price of gas to private consumers had been raised by the Gas Light and Coke Company from 2s. 9d. to 3s. 1d. per thousand cubic feet. In June, 1894, the Company reduced the price from 3s. 1d. to 3s. per thousand, and intimated that, if their finances permitted, a further reduction of 1d. per thousand would be made in December; but, to the Vestry's astonishment, the company, at the same time, raised the price of the gas supplied to *public* lamps from 2s. 2d. to 2s. 4d. per thousand. Bearing in mind the fact that on the south side of the River Thames, where there is a competitive supply, the company's charge to private consumers was only 2s. 4d. per thousand, the Vestry addressed a letter of remonstrance to the company, protesting against the endeavour to indemnify themselves at the expense of the ratepayers against any loss they might sustain by making a reduction in the charge to private consumers. The company rejoined by stating that, in the parish of Chelsea, the reduction of 2d. per thousand equalled a sum of 3,600*l.*, whilst the increase in the cost of gas consumed in the public lamps would amount to only 200*l.*—or a net annual reduction in the company's revenue of 3,400*l.* It would appear, however, that the remonstrance of the Vestry was not without effect, inasmuch as in the following July the company announced that the charge to private

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consumers would be still further reduced to 2s. 10d. per thousand, at the close of the quarter. The Report touches also on the subject of the frost and water supply, in regard to which it is mentioned that more than 650 applications were made to the Vestry for licenses to open the roadway for the purpose of repairing burst water-pipes. In this connexion an important question was raised as to liability for the repair of the burst pipes, but at the close of the year the Law Committee were still deliberating upon the matter.

IN the Surveyor's Report to the Chelsea Vestry (which is a distinct document from the Vestry Report) some information is given as to the use of various granites for macadam, in experimental lengths of road. The granites experimented with were Hartshill, Belgian, Enderby, St. Ives, and Guernsey. The Belgian shows the worst record, the Enderby is a little better. The Guernsey, Hartshill, and St. Ives pavements appear to have worn about equally well; it is found that the St. Ives macadam breaks very small under traffic, but maintains its surface well. The outcome of the experiments is a recommendation to make further trials of Hartshill and St. Ives granite.

A REPORT by Dr. King Warry to the Board of Works for the Hackney District, on the sanitary condition of the district, contains some points worth attention. In regard to an outbreak of diphtheria in an establishment where a number of girls were employed, Dr. Warry, although noticing some sanitary defects, did not find cause to attribute the outbreak of the disease to them, but came to the conclusion that it had been introduced from without by one of the inmates, and that it had probably been communicated to others on another floor through the medium of the speaking-tubes. He says:—

"In confirmation of the above view, I must refer to the earlier part of the report, in which I state that only one of the shop assistants on the ground-floor suffered from sore throat. I learned, on inquiry, that it was the special duty of this assistant to answer the speaking-tube communicating with the infected workroom. Whether the tube had become infected throughout its whole length, and so conveyed the infection to this assistant, or whether her illness was a coincidence, I cannot be certain; but I do think the incident significant, and confirmatory of the above views."

On another page of the report we read a gratifying account of the condemnation and demolition of twenty-four back-to-back cottages in Jerusalem-gardens, at the instance of the Medical Officer and after a considerable diplomatic correspondence. Another point touched upon in the Report is the dirty condition of the River Lea, which was the subject of complaint in Dr. Warry's Report of the previous year. The Lea receives the effluents from the Leyton and Walthamstow sewage farms, and the London County Council have lately constructed a bathing-pool in the recreation-ground of Hackney Marsh, to be fed by the Lea water from a point below the entry of these "effluents." As remarked in the Report, "it is obvious that water, little removed from sewage, is not fit to be turned into a bathing-pool. I am of opinion that it is the duty of the Lea Conservators to prevent this nuisance; but in the failure of this body to do their obvious duty, either the Local Authority, or the London County Council, or both, should press the Conservators to bring an action against the offending Local Boards to compel them either to produce a pure effluent, or to turn it into some other channel. Such proceedings would of course be taken under the provisions of the Rivers Pollution Acts." In regard to the question of water-supply, Dr. Warry considers tnat the failure of the East London Water Company to give a constant supply during a part of the year when it is most essential, opens up the serious question whether the present is a proper and sufficient supply for such a district as Hackney. A "proper and sufficient supply" is at least one which will be able to meet a drought of two years without restricting the supply to the consumer. This the East London Water Company has failed to do. Moreover, adds Dr. Warry, "the satisfactory working of our present system of drainage and sewerage is dependent upon an adequate and unstinted supply of water," a point which we have urged frequently.

THE transactions of the American Society of Civil Engineers for last June contains an excellent paper by Mr. E. Gerber on the painting of iron structures exposed to the weather. Much attention has been given to the subject of preventing rust by painting, and much has been both said and written during the last few years about the worthlessness of iron oxide as a pigment in paints used for coating iron, and on the supposed superiority of red lead for such purposes. The objection urged against iron oxide is that some of it is manufactured from iron by the action of a sulphur compound, and consequently it is supposed to contain sulphur, which would of course be deleterious to the ironwork covered by such paint. In the case of red-lead it is claimed that it forms a chemical combination with the oil with which it is mixed, and that, when properly applied, it adheres with great firmness, forming an absolute covering, which is impervious to both air and water. In order to ascertain the value of various paints after they had been in use some years, Mr. Gerber examined a large number of bridges, and from his observations he comes to the conclusion that pure iron oxide, used as a pigment in paint, forms a most effective covering, and is not itself a cause of the rusting of metallic structures, but is quite as good as, if not better than, red-lead. With many of his remarks on the system of painting now generally adopted we thoroughly agree. He says, for instance, that structural ironwork should not be painted at all before it leaves the manufacturer's yard, it being much better to merely give it a coat of pure linseed oil. This, no doubt, is a good rule to adopt, because, in this country, at least, the manufacturers are so anxious to get the ironwork sent away—to clear their yard—that it very frequently happens that the painting, being the last operation, is badly done, and if wet weather happens to prevail at the time it is worse than useless. Besides these drawbacks, when the ironwork has been painted it is much more difficult to ascertain if the workmanship has been what was required. The first requisite in the direction of preserving iron structures is to ensure absolute cleanness of metal before anything is applied. This is best secured by thoroughly "scraping" it in the shop; and immediately after this is done the work should receive a coat of oil, applied when the surfaces are quite dry. In this way nothing is invisibly covered up, and if the scraping and cleaning has not been properly done it will be apparent. Those in charge of the erection can then easily see if everything is as it should be, and can superintend the final painting themselves.

THE utilisation of the heat generated in dust-destructors has been a favourite problem for engineers during the last few years. The solution which has commended itself to the Shoreditch Vestry is to use it for generating steam to drive electric-lighting engines. Their combined dust destructor and electric-lighting station, which is now in course of construction, is expected to begin working next January. This scheme is being worked under favourable circumstances, and it will be watched with great interest by local authorities elsewhere, as it seems that the destruction of refuse by fire must sooner or later become a necessity. Forced draught will be used, so that the combustion will be practically perfect, the temperature being well over 1,500 deg. Fahrenheit. As the heat generated will be practically uniform during the twenty-four hours, and as the load on an electric-lighting station is a very variable one, the evening load being often twenty times as great as the morning one, special arrangements have been made for storage. The great cost of accumulators excluded their adoption for the entire storage of the excess energy, so thermal storage on the system devised by Mr. Halpin was adopted in addition. The boilers will be constantly employed generating high-pressure steam and passing it into cylindrical receivers enveloped in non-conducting material. These receivers will be nearly full of water, which will be maintained by the steam at a temperature nearly equal to that in the boilers. This water so heated will give off steam, and thus meet sudden fluctuations in the load, the engine-power being about four times the destructor and boiler power. As the feed water also passes through the cylinders, there will be no deposit on the boilers, a deposit on the receivers doing no harm, as no part of them is in contact with the flame, and being of simple construction, they can be readily cleaned. The success of the scheme in Shoreditch seems assured, as already a great many orders have come in for electric lighting and power, there being a large number of small factories and workshops near the station, where electric motive power will be very acceptable.

WHEN will house-agents and others learn that the sale of house property is not expedited by disfiguring a street with great staring bills and posters on hoardings? It is strange to find a body of men of acute business ability deliberately pursuing a method of advertising which in no inconsiderable measure helps to defeat rather than promote their own object. What is the effect of a display of this kind upon the average house-hunter? A street which presents a large and varied assortment of announcements of this character is at once condemned as an undesirable place of residence; the beggarly array of empty houses, to which attention is directed in the most emphatic manner possible, conveys in all probability an entirely false impression as to the real character of the thoroughfare; but to an intending resident the appearance of a street is of considerable importance; and if it be neglected, as it undoubtedly is in this respect, the landlord inevitably suffers in consequence. One cause which contributes to the aggravation of the evil is the practice of employing two or even three house-agents to let the same property. An empty house thus becomes the scene of a brisk competition between the two or three business rivals, who between them frequently succeed in spoiling the appearance of an otherwise attractive habitation. Would it not be possible to improve matters by substituting smaller notices for those now commonly used? That some such reform would greatly improve the appearance of hundreds of streets in the Metropolis, and elsewhere, cannot be doubted; and bearing in mind that improvement in this direction means enhancing the value of house property, the question certainly appears to be worth the consideration of those who are interested in the business aspect of the subject.

THE new premises for the Birkbeck Building Society now in course of erection stand on the east side of Southampton-buildings, where a large area has been cleared. Amongst the houses pulled down was the last remaining portion of the London Mechanics' Institute, which Dr. Birkbeck founded in 1823, and which was subsequently named the "Birkbeck Literary and Scientific Institution." It is now established in the premises opened in 1884 in Bream's-buildings, Fetter-lane, of which we gave an account in our issue, of September 27, that year. The Building Society and Bank was

established nearly fifty years ago. The new offices abut on the site of the Old Temple, whence the Templars, after a sojourn there during twenty years, migrated in 1184 to Fleet-street. Bream's-buildings was extended into Fetter-lane in 1881-2. It had come into possession of the Ecclesiastical Commissioners two years before, and consisted of squalid houses, the homes of many members of the criminal classes. According to Wale's "London and its Environs Described," 6 vols., 1761, it is named after one Breme, the landlord or builder thereof.

THE volume of the "Transactions of the Society of Engineers for 1894."* including also a complete index and list of papers from 1857 to 1894, contains practical papers of great value and interest, which is added to by the full publication of the discussions. Among the papers of principal interest to our readers is that on "Pile-driving," by Mr. Henry O'Connor, and on the "Utilisation of Town Refuse for Generating Steam," by Mr. T. W. Baker.

IN order to encourage students, and Associates not in practice, to prepare themselves for the R.I.B.A. examination, the Northern Architectural Association are offering prizes of two guineas and one guinea respectively for the best set of drawings or "Testimonies of Study," as required by the Institute for the "Final Examination." It is intended to offer similar prizes also for the probationary work for the "Intermediate Examinations."

THE secretary of a provincial architectural society writes to us:—"About Christmas time you threw out a hint in your columns to architects with superfluous books or duplicate copies that they might seasonably remember struggling provincial societies. This appeared to me a particularly happy idea, but unfortunately your suggestion was not acted upon. I would go further and propose that architects without family, or without sons following their profession, should bequeath their libraries to such societies. In many cases an architect's family takes little or no interest in the professional literature he has left behind him, and before long the books are stored away and probably forgotten." Perhaps architects who are making their wills may be disposed to bear in mind the suggestion of our correspondent. It is, we believe, not infrequently the case that collections of architectural works made by an architect are of little use or interest to any of his relatives after his death, and it would be a good deed to provide for the books going where they would be of real service.

WE are glad to see that Mr. Ruskin, who has been interviewed on the subject of the wretched proposal to destroy the Falls of Foyers, has expressed himself, as might have been expected, in the strongest terms of indignation at this proposed destruction of one of the most beautiful scenes in Scotland in the interests of a trading company.

THE BRITISH ASSOCIATION.

THE Ipswich meeting of the British Association, which terminated on Wednesday last, was fairly well attended throughout, but the papers read were not up to the standard of some previous years. The fact is, we no longer look to the Association to yield us anything sensational in the way of scientific discoveries. Years ago, when but few scientific societies were in existence and science as a whole was more noisily pursued than it is at present, the meetings of the Association afforded an opportunity of getting rid of much that is now discussed elsewhere. In those days, when anything important had been discovered, the results were stored up until the next meeting of the Association, but now, scientists cannot wait so long, they are impatient and must make known the results of their work as soon as possible.

It is thus easy to see why the annual meetings were looked forward to with feverish interest by scientists. Almost the sole objects of attending them now are for the good fellowship engendered by the occasion, and to make good any excuse that may have been put forward for the loosening of the Association's purse-strings on behalf of the person attending. If he does not attend he may not obtain the "grant;" or rather, if his friends and supporters do not attend it may be lost. And as to the grants: many of them are, no doubt, given to individuals who are conscientiously working and require material assistance, but one cannot look over the list year after year without asking whether, in certain cases, these grants have not been transformed into pensions. Why is it that money is voted every year to those scientists of the old school whose sole duty in life, apparently, is to describe so-called new species of animals and plants? Their only contributions to the "advancement of science" is in burdening the literature with interminable synonymy. They do nothing in the way of working out the analogies of the "forms" described, and their "science" has now degenerated, as seems fitting, to a species of lore. This sort of thing did very well in the absence of deeper work, but it is no good nowadays—so says the younger school of scientists.

Another thing that strikes us as becoming more and more developed every year is the tendency to compile papers to be read before the Association, for advertisement purposes. Almost the only occasion the daily papers take notice of the different professors and their *protégés* is at these meetings, and the average scientist is not above improving that occasion, we are sorry to say. No one can look over the papers read who knows much in a specialised manner about the different branches of science, without feeling that he has seen the majority of those papers before. They are now served up as a new dish, and are relished by few; this is more particularly the case with the sections devoted to pure science, in some of which, we happen to know, there is difficulty in getting sufficient papers to spin out the meetings. The aim of many contributions, apparently, is to catch the eye of the public, so subjects like civilisation, cannibalism, and missionary enterprise come well to the front. But if the average scientist likes to see his name in the daily paper and shapes his course accordingly, he has a most profound contempt for the "science" found in the daily Press, and small wonder at it. The reports of certain of the speeches delivered last week will assuredly be cherished by the orators as magnificent examples of what can be done by the newspaper reporter when the latter does not understand a particle of the matter under discussion, and feels compelled to furnish an original contribution to his paper, based on the speeches referred to. If the reporter occasionally shears the scientist of his degrees and other attributes, he makes up for the omission by showering new dignities and honours right and left. In one instance during the past week a dead man—the late Professor Seeley, of Cambridge—was made to deliver a speech on dinosaurs; but that, we suppose, does not matter for "the general reader."

The President's address was read at the opening meeting on Wednesday, and we referred to that in our last issue. Thursday was occupied in hearing the addresses of the presidents of sections. We will briefly allude to such of these, and to papers subsequently discussed, as may be interesting to our readers.

In the Chemistry Section Professor Raphael Meldola reviewed the state of the science in 1851, and briefly glanced at recent developments. After alluding to the discovery of argon, he remarked that Professor Ramsay had isolated helium, a gas discovered by means of the spectroscope in the solar chromosphere in 1868. Like argon, helium is monatomic, and chemically inert so far as the present evidence goes. The isolation of helium had not only furnished another link proving community of matter, and, by inference, of origin, between the earth and the sun, but an extension of the work by Professor Norman Lockyer and others had resulted in an interesting discovery that a large number of the lines in the chromospheric spectrum, as well as in certain stellar spectra, which had hitherto found no counterpart in the spectra of terrestrial elements, can now be accounted for by the spectra of the gases contained with helium in certain rare minerals. The question now to determine was whether these gases are members of the same monatomic inert group as are argon and helium.

Mr. W. Whitaker, in the Geology Section, delivered a popular address entitled "Underground in Suffolk and its Borders." The chief object was to show how well-sinking has furnished a knowledge of geology which would otherwise not have been obtainable. The results of borings for coal in the south-east of England were used in illustration. Practically nothing new appeared in this discourse, and our readers are familiar with the main outlines of the subject from what has appeared in the *Builder* from time to time. The only addition had reference to a boring in the eastern counties.

In the Zoology Section, Dr. Herdman gave a general discourse on the science. Amongst other things, he touched on the diseases of edible animals. Speaking of disease communicated by mussels, of which we have heard so much lately, he remarked that it is clearly of the greatest importance to accurately determine under what conditions the mussel can become infected by micro-organisms, in what stage it is injurious to man, and whether, as is supposed, steeping in pure water, with or without the addition of carbonate of soda, will render poisonous mussels fit for food. The supposed connexion between oysters taken from contaminated water and typhoid was alluded to, and the president said that this point could only be solved by actual experiment.

Mr. L. F. Vernon Harcourt delivered an address to the section devoted to Mechanical Science upon the relations subsisting between engineering and the sciences of mathematics, physics, geology, chemistry, and meteorology, the chief object being to show that engineers did a lot of useless work through not studying the practical applications of these sciences so far as they bear on his profession. The scientific training of engineers was touched upon, in the course of which he remarked that the Institution of Civil Engineers had in recent years required some evidence of young men having received a good education before their admission into the student class, but it was quite unnecessary to become a student at the Institution in order to become an engineer. Engineers of the past were, mostly, self-taught men, but he thought that all recruits to the profession at the present day should show ample qualifications in theoretical knowledge at the time of their entrance. He struck the key-note to the whole subject, however, in remarking that if men of science, by closer intercourse with engineers, could realise more fully the practical capabilities of their researches, and engineers, by a more complete scientific training, could gain a clearer insight into the scientific aspect of their profession, both might be able to co-operate more thoroughly in developing the resources of Nature, and in furthering the intellectual and material progress of mankind.

On Friday all the sections were busy. The Geology Section gave ear to Professor Sollas' description of how glaciers can crawl up hill, and to the consideration of flint implements found at Ightham, in Kent. The Mechanical Science Section reviewed the "Growth of Harwich," and the general tenour of the paper read by Mr. William Birt was an advertisement for the Great Eastern Railway Company. Mr. G. J. Symonds contributed some notes of facts and figures relating to the autumn floods of 1894, suggesting that much damage could be prevented by engineering remedies based upon observations and records. He exhibited a series of photographs illustrating the conditions produced by floods at various places on the Thames. A paper was contributed by Messrs. Rapier and Stoney on the practicability of controlling the discharge of flood waters by means of removable weirs more efficiently than by fixed weirs. From the drainage aspect, it was stated, the fixed weir was only a blundering, stupid obstruction; and the first use of a river was the drainage of the country. The rainfall reaches the river more rapidly now than formerly, and therefore the river ought to be widened, deepened, or straightened; but for navigation there must be capacity without velocity. The river must be fully capable of discharging maximum floods under modern conditions. The fixed weir must be low enough to allow the flood waters to get off somehow, and during ordinary river flow has to put up with less head of water and less power than Nature supplies. Thus the fixed weir provides only an efficient compromise; and it was obvious that the *maximum* range of

* London: E. & F. N. Spon.

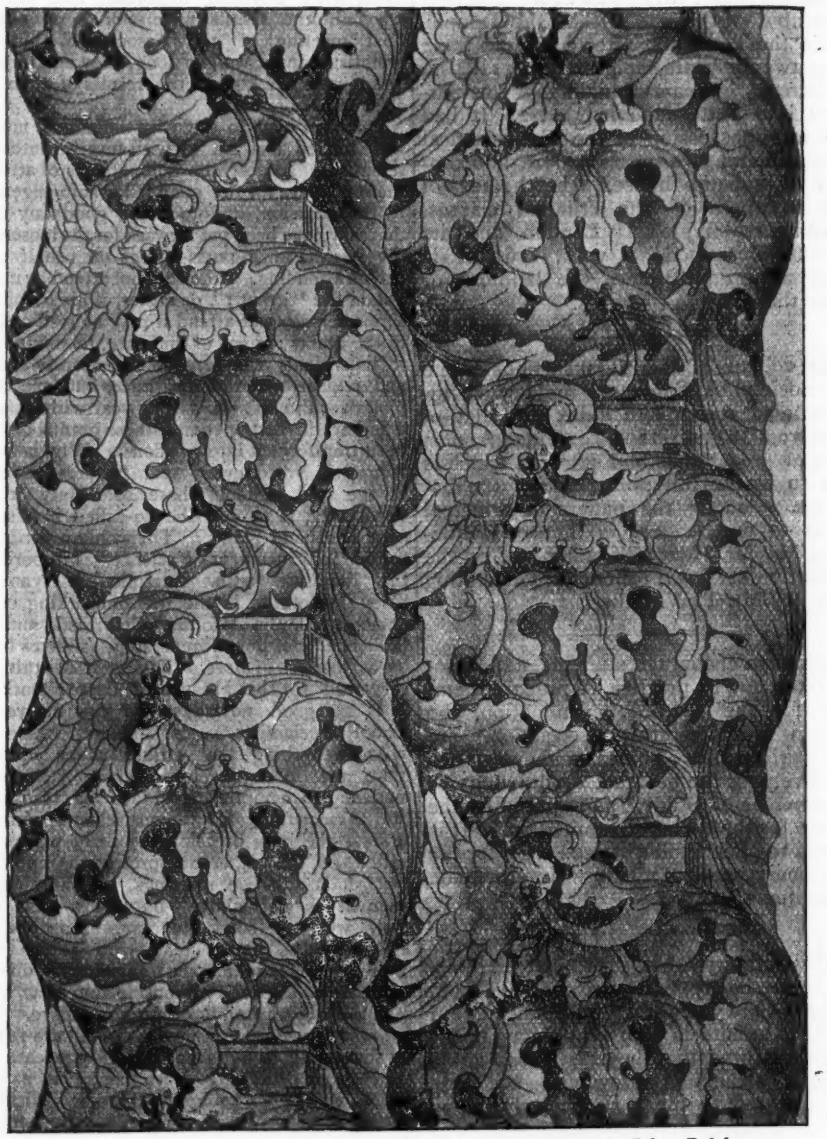
requirements may be fulfilled by means of a removable barrier. Removable weirs—a sluice-gate on free rollers—could be applied to any river for navigation, irrigation, or power. They could be operated under all conditions of head and flowing water. The great sluices erected twelve years ago at Beleek to control the waters of the Loch Erne group of lakes are a fair example of maintaining a full summer water level for navigation and mill power whilst giving absolute command of great periodical floods. The Manchester Ship Canal affords a useful example of the application of these sluices to canalised rivers. There are others across the Rhone near Geneva, at Richmond on the Thames, and for the river Clyde at Glasgow.

On Monday, in the Section of Mathematical and Physical Science, Professor John Milne presented the report of the Committee on Earthquakes in Japan. It contained the records of the Gray-Milne seismograph during the past year, and included a catalogue of 8,331 earthquake shocks recorded in Japan between 1885 and 1892. The catalogue gives the position of the origin of each shock and the extent of country sensibly disturbed, and it enables Japan to be divided into fifteen seismic districts. It may therefore prove of great assistance in future inquiries. The report then dealt with the propagation of earthquake disturbances on the surface of and possibly through the earth.

In the evening the hall was well filled by an audience consisting chiefly of working men, to whom Dr. Alfred Fison delivered a lecture on "Colour."

M. M. Ernest van den Broeck and G. Dollfus made communications to the Geology Section on Tuesday on the Tertiary Beds of North-Western Europe, which has considerable practical bearing from water-supply and other points of view, but all the particulars given have been known for years to students of the subject, and we cannot conceive why the papers should have been admitted. A chapter from a recent text-book on geology would have done quite as well. In the Mechanical Science Section the day was devoted to electricity, when Mr. Philip Dawson described in detail the modern applications of electricity to traction purposes. He insisted upon the especial adaptability of electric traction to tramways and light railways. Three methods of electrical power transmission were practically employed—(1) elevated conductors with trolly contact; (2) sub-surface conduit; and (3) surface or third rail conductors. The first was by far the most efficient and successful, and in most extensive use. Mr. Bennett dealt with the development of telephonic communication in the United Kingdom, which he said was inferior to what had been attained in many foreign countries; and an improved photometer was exhibited and described by Messrs. Trotter & Preece.

The engineer to the New River Company made a communication to the geologists on Tuesday respecting the dip of the Underground Palæozoic rocks at Ware and Cheshunt. The borings at these places were undertaken by the New River Company with the object of procuring water from the Lower Greensand; but on reaching certain depths it was found to be hopeless to expect water from below the Gault. Orders were about to be given for a cessation of the work, but on the expression of a wish by certain geologists that attempts might be made to learn the direction of the dip of the lowest stratum reached, in each case, the company generously ordered the investigations to be made at their own expense. The borings were made by the use of black diamonds; but, though the exact angle of dip of the material pierced can be accurately ascertained, the rotation of the apparatus precludes all knowledge of the direction of the dip. Hence, special means, both magnetic and mechanical, which were described in detail, had been devised for this purpose. The results of the borings showed that the general indications of the strata were at right-angles to the directions of the chief axis of the Weald. On the same day the Mechanical Science Section dealt with the field telegraph in Chitral, which showed how rapidly and efficiently temporary telegraphs may be constructed. In the Botany section, Mr. H. Wager dealt with the relations existing between bacteria and disease, which contained practically nothing new; and by Wednesday several of the sections had concluded their work, though in the Mathematical and Physical Section a few papers were read. They dealt principally with subjects relating to chemistry and magnetism. Mr. E. H. Griffiths described an apparatus for standardising high-temperature thermometers.



Wall Paper designed for Messrs. Hayward & Son by Mr. John Belcher.

WALL-PAPER DESIGNS.

THE designs by Mr. John Belcher and Mr. Beresford Pite illustrated herewith, are prepared for execution with printed outlines, and hand colouring and shading by stencils with water colour, a process recently introduced by Messrs. Hayward & Son, of 88, Newgate-street. The obvious difficulty of hanging the shaded edges of two pieces of paper together, in order to obtain a continuous and unbroken effect upon the wall, has been obviated by Messrs. Hayward's patent joint for wall-paper hangings.

THE INFLUENCE OF POETRY ON ARCHITECTURAL DEVELOPMENT.*

BY G. L. SUTCLIFFE.

ALTHOUGH in its early stages poetry is akin to religion, and, indeed, a part of religious literature, it soon slips its leading-strings and follows its own fancy whithersoever it listeth. Men begin to love poetry for its own sake, and poets strive more and more for beauty in feeling, thought, and form, so that at last poetry is called a fine art, and takes rank with architecture, sculpture, painting, and music. The influence of poetry on the development of architecture is specially interesting, because poetry is the only branch of literature which has been admitted within the æsthetic pale.

The beauty which is admired in one art has, it has been said, affinity with the beauty of all the others, and, as a corollary to this, the same general principles govern one and all. Whether the latter statement be true or not need not be discussed here, but it may be admitted that it is at least partially true. The sense of fitness and the quality of restraint, which the Greeks possessed in so large a degree, are exhibited as well in their poetry as in their buildings and statuary. There is no tawdriness or fustian either in their dramas or their temples. The poet and the architect express themselves with equal clearness and simplicity of parts, and with equal refinement. The delicate shades and distinctions of the Greek language—the most expressive (it is said) of all languages—have their counterpart in the wonderful niceties and subtleties of Greek architecture. The Greek particles and turns of phrase have the same *raison d'être* and the same effect as the faint entasis of their columns and the almost imperceptible curvature of plinths and cornices. There can be no doubt that architects profited by study of the masterpieces of Greek poetry, and endeavoured to give to their buildings, as far as possible, the qualities which delighted them in the literature. Speaking of "The Importance of Greek Art and Literature to the Practice of Gothic Architecture," the late William Burges said, "The great use of the study of literature to an architect is not only to educate him, but to give him that judicial power which is called good taste." And of all branches of literature none is more calculated to attain this end than the study of true poetry.

It is somewhat surprising to find that, while discussions on the nature and inter-relation of the various fine arts have been frequent during the last two hundred years, no special treatise appears to have been written on the relation of poetry and architecture. Poetry and painting have been frequently discussed—by Dufresnoy in France, Dryden in England, Lessing in Germany, and also by many subsequent writers. Perhaps it is because architecture and poetry are considered to be the two extremes of art that no special treatise has been written respecting them. Hegel, for instance, arranges the five fine arts in the following order, rising from the material to the spiritual:—architecture comes first and lowest; then follow sculpture, painting, and music; and the crown of all is poetry. There are certainly fundamental differences between the two arts: architecture has been termed non-representant and mute; poetry representant and vocal; architecture is fettered by bonds of wood and brick and stone; poetry is free as the sunshine and the wind; architecture is yoked eternally with utility;

* From an essay submitted in competition for the Essay Medal of the Institute of Architects, which obtained the second place and a prize.

Wall Paper designed for Messrs. Hayward & Son by Mr. Beresford Pite.

poetry goes her own sweet way and is an end to herself.

But architecture and poetry, although so different in many respects, have yet much in common, for architecture never attains surpassing excellence save when the star of poetry is in the ascendant. Indubitably, the first steps of architecture are hand-in-hand with religion, but religion and ethics alone do not suffice for the development of the noblest architecture, else would Jewish buildings have been the delight of the world, and the architecture of the Early church, of the Reformation, and of all fanatical sectaries be among the worthiest. Something more is required than zealous attachment to a faith and eager fulfilment of its duties; and what is required is expressed by the word *culture*—not culture pampered to effeminacy, but a manly development of faculty and broadening of sympathy. It is only, to use Matthew Arnold's terms, when Hebraism is tinctured with Hellenism, that architecture rises to supreme excellence. Religion still remains the motive power, but culture controls it, and as a gardener, swaying the forces of nature, duplicates her beauties and leads her to out-rose the rose, so culture adds grace and beauty to the grandeur and mass of sacred architecture.

If we turn to the Egypt of the eighteenth and nineteenth dynasties—the great period of Egyptian architecture—we find that religious literature has ceased to be without a rival. Poetry has taken a prominent place. The songs of triumph written in honour of the victories of Thothmes III., of Seti I., and of Ramesses II., possess undoubted power and an Eastern wealth of imagery. The sculptor's rhapsody on completing the colossi of Amenhotep's vast palace-temple shows the development of lyrical expression. The masterpieces of Pentaour, Kakabu, Nebsenen, Enna, and others—Rawlinson declares—afford pleasure even to the modern reader. In Babylonia a long train of poetry, including the epic of "Gizdhubar" in twelve books, the poem on "The Descent of Ishtar," and many others, preceded the full development of architecture. The development of poetry can be more clearly traced in Greece,—from the great Epics ascribed to Homer, through the Elegiac, Iambic, and Lyric verse of Archilochus, Sappho and Anacreon, Simonides and Pindar, to its culmination in the Attic drama. And during all the early stages of development the poetry was of a higher quality than the contemporary architecture. When Homer wrote there were no temples of importance, probably none at all. Sappho's songs, "of incomparable melody," rang in men's ears, while architecture, as witness the old temple at Corinth, was rude and clumsy. Simonides, an old man of seventy-six, earned his greenest laurels during the years of the Persian invasions, when Athens was a waste of charred timbers and blackened walls. Pindar alone of these great singers, lived on into the Periclean age, and he, four-score years old, sang his swan-song at least a lustrum before the Parthenon was finished. It was a "poetical basis on which the culture of the Greeks reposed. The spiritual elevation, the true liberality, the nobleness of conception which belonged to the best Greek character are in some measure fruits of that long sovereignty which great poetry had held over the race."* It was with imagination quickened and taste refined by contemplation of this wonderful heritage of verse, and by listening to the new creations of the great living dramatists, that Ictinus and Pheidias, Callicrates and Mnesicles designed those buildings which have made the Acropolis of Athens the most famous rock in the world.

The indigenous Roman architecture of her early kings, and the ballads and sacred literature of the same period, have alike perished and neither the architecture nor the literature which flourished when Rome was in the zenith of her power, can really be considered native creations; but even in Rome, the cultivation and appreciation of poetry, as in Greece, preceded and assisted the development of architecture. The greatest figures in Latin literature are poets. Rome's greatest dramatists, Plautus and Terence, died when Roman architecture had scarcely begun to exist. Satiric and other verse accompanied and followed the drama, and in the next century, the brilliant lyrics of Catullus led up to the golden age of Latin poetry, when, in the hands of Virgil and Tibullus, Horace and Ovid, epic, lyric and elegiac verse alike, approached perfection of style and expression. It was in the latter part of this golden age of poetry, that Rome changed from brick to marble, and that Roman architecture flourished in its highest purity.

Byzantium produced little poetry or even literature of any kind, above mediocrity. "Not a single composition of history, philosophy, or literature, has been saved from oblivion by the intrinsic beauties of style or sentiment, of original fancy or successful imitation." Such is Gibbon's dictum.* Certainly the fourth-century was utterly barren of poetry, but in the fifth century—the century preceding the age of Justinian—some taste for it does appear to have arisen, for a few new works were written, such as the epics of Nonnus and Smyrnæus, while the poem of Musæus on the story of Hero and Leander, composed probably about 500 A.D., is described by Professor Jebb as "of much beauty." At the best, however, the appreciation of poetry was slight. Men's intellects were engaged in ecclesiastical controversies and disquisitions, to the exclusion of higher literature, and the narrowness of soul begotten of such mental occupation is visible in the poverty of invention which left the exterior of St. Sophia so ugly and chaotic. The same poverty of invention and archaic stiffness of pose which characterise Byzantine architecture and figure-drawing of the age of Justinian, are apparent in the buildings of Western Europe to a much later date. Even the elaborate Cathedral of Pisa, belauded as it has been, half amuses by the naïveté of the design of its western front, while the adjacent campanile is almost childish in its repetition of story on story. If we turn to France as "the cradle of Gothic architecture," we find that a wealth of rude epic poetry, gathering around the names of the Christian champions, Clovis and Charles Martel and Charlemagne, partly preceded and partly accompanied the development of the Romanesque style, while the first appearance of the brilliant lyric poetry of the Provençal troubadours and the narrative poetry of the northern trouveurs preceded the dawn of the new style of architecture by nearly half a century. And as the poetry of France shed its influence on all the neighbouring conntries, and roused them to emulation, so the influence of France can be traced in the Gothic architecture of England and Spain, Germany, and Italy. And the age which saw the culmination of Mediæval poetry in the great epic of Dante, the songs and sonnets of Petrarch, and the poems of our great Chaucer, has been styled the age of perfection (although not of greatest activity) of Mediæval architecture.

The growth of native poetry is a necessary factor in the development of the noblest architecture, and the correlated truth may be predicated that the assimilation and imitation of an alien nation's poetry lead to the introduction of the same nation's architecture. Assyria borrowed both her literature and her architecture from Babylonia. The transplantation of Greek architecture to Roman soil followed the translation and imitation of Greek poetry, and was largely due to it. The delight in the culture of Greece, which sprang from study of her literature, impelled the Romans to study and strive to imitate the more laborious beauties of her architecture. Before Republican Rome fell under the spell of Athens she had neither architecture nor literature of value. Indeed, while the Republic was in its noblest vigour Romans were too rough and stern to take pleasure in the Fine Arts. As late as 187 B.C. Marcus Porcius Cato opposed the granting of a triumph to M. Fulvius Nobilior, partly on the ground that "he cherished literary tastes, and even kept poets in his camp!" And in the same century the erection of permanent theatres was forbidden by statute. But the tide of Greek culture could not be stemmed even by Cato and the Senate. Livius Andronicus, a Greek from Tarentum, had introduced translations of Greek plays. He, a Greek, has been called the father of Roman dramatic poetry. Plautus and Terence, who are the chief Latin dramatists, were directly "inspired" by Greek works. Yet even at the death of Terence (159 B.C.) there was no architecture; all the buildings in Rome were of brick or local stone; there was probably sound construction, but

* Jebb: "Greek Literature."

* "The Decline and Fall of the Roman Empire."

nothing was heard of architecture as a fine art.* Macedonia became a Roman province in 146 B.C., and the imitation of Greek literature issued at the first opportunity in imitation of Greek architecture. But architecture could not flourish during the ferocious civil wars of the first seventy years of the first century B.C. The years which saw the repeated struggles of Marius and Sulla, the gladiatorial war, the conspiracy of Catiline, the fierce strife between Pompey and Cæsar, the fight for existence of the second triumvirate, and the crowning struggle of Antony and Octavianus, were not apt for architectural development. In the brief rule of Julius Cæsar some progress was made, but it was not until Octavianus became Augustus that Rome began, in earnest, that course of building which had, for ultimate issue, the development of complex vault and soaring dome.

Literature, however, had not been silent during the period of architectural barrenness. Lucretius put the Epicurean philosophy into verse. Varro and Cicero wrote moral, political, and philosophical essays, and Catallus, "the greatest lyric poet of ancient Italy, and one of the greatest poets of all ages," after close study of Greek poetry, wrote his playful society-verses and sang his passionate exquisite love-songs. In the closing years of the long civil wars Virgil gave his "Eclogues" and "Georgics" to the world, and Horace wrote some of his charming "Odes"; the debts which these poets owed to Greek works are too great to be overlooked. When Octavianus became Emperor, the fruit of the long intimacy with Greek poetry which the Romans had enjoyed, appeared in art. All kinds of buildings were now erected—temples both rectangular and circular, the theatres of Balbus and Marcellus, the baths of Agrippa, triumphal arches, the emperor's mansion and the Palatine library, the emperor's tomb (built during his lifetime), and numberless large and ornate private houses. If Rome had not fallen under the spell of Greek poetry, it is more than probable that she would not have adopted Greek architecture.

But the most important revival of architecture which the world has yet seen is undoubtedly the Italian Renaissance, which commencing in the fourteenth reached its culmination in the fifteenth century. The Renaissance was essentially a literary movement, and its origin may be traced back to the great Mediæval poet, Dante, who lovingly acknowledged Virgil as his master. Petrarch, who was not content with writing Italian poems but showed his appreciation of classical literature by composing a Latin epic on "Africa," owed much of "his exquisite elegance of diction" to "the perpetual study of Virgil"; † and Boccacio, at Petrarch's request, translated both the "Iliad" and "Odyssey" into Latin. The fountain-head of the Italian Renaissance is found in the appreciation of classical poetry, but the stream was rapidly swollen by study of every scrap of classical literature on which hands could be laid.

While it was impossible that in later centuries there could be any revival of classical literature corresponding in magnitude with that which took place in Italy during the fourteenth and fifteenth centuries (for the loss of ancient learning has never been as complete as it was in the dark and middle ages), it is true that the appreciation of classical literature has waxed and waned. And in our own country we find that the period in which Latin poetry was held in highest honour—when quotations from Latin poets were in all men's mouths, and when English poets took keenest pleasure in Latin polish and artifice of style—was the period when Roman architecture held undisputed sway. The age of Dryden, translator of Ovid, Lucretius, Horace, Juvenal, Persius and Virgil, was the age of Wren. The age of Pope,‡ translator of Ovid and imitator of Horace, was the age of Hawksmoor, Vanbrugh (himself a dramatist), and Gibbs.

The revival of Greek architecture in England has been boldly ascribed by Burges to the effect of poetry, although not to a revival of Greek poetry. "Although Greek architecture," he said in 1876, "was known and described a hundred years ago, it was little practised until Lord Byron published his poems and made us all Philhellenists." The same speaker declared that the "quasi-Mediæval romances" of Sir Walter Scott "caused the Gothic revival to set in; but this statement is undoubtedly erroneous, for Horace Walpole's villa at Strawberry Hill was built in the ten years from 1760 to 1770, about half-a-century before "Waverley," the first of Scott's novels, appeared. The germ of the Gothic revival must rather be looked for in Defoe, whose revolt from the artificiality of the current literature might well give men occasion to reflect upon the artificiality of the architecture of the period. But perhaps the nearer cause of the revival may be found in the novels of Richardson, Fielding, and Smollett, all of which, except two, were published before 1754, six years at least before Walpole's villa was begun. Probably, however, the secular literature which most aided the spread of the Gothic revival, was Percy's celebrated collection, "Reliques of Ancient English Poetry," which achieved instantaneous popularity on its publication in 1765. This and the "quasi-Mediæval" poetry of Chatterton and Macpherson might well draw the attention of men to Mediæval architecture. Nevertheless, the Gothic revival would never have attained the importance it afterwards assumed, had it not been for the great revival of religion which, beginning with the fervent preaching of Wesley and Whitfield, gradually permeated all ranks of society from the lowest to the highest. The Gothic revival was essentially a religious movement, although not uninfluenced by secular literature. Indeed, it was not until a new era of poetry had fully dawned, that the progress of the new style was assured. The splendid body of verse which marked the close of the eighteenth century and the opening of the nineteenth, and which included the works of Burns and Scott, of Wordsworth and Coleridge, of Byron, Keats and Shelley, showed the full tide of the reaction against the previous artificial style based on classical models. Poets reverted to Nature for their inspiration, and architects returned to a style which seemed more adapted to English needs than did the columned styles of Greece and Rome. The principles of truth and sincerity which animated the new literature, were ardently advocated and practised by the enthusiasts of the new architecture.

But the force of that burst of poetry which marked the opening of the century, has not yet expended itself. A milky way of brilliant names has wound along the century, from Wordsworth and Coleridge to Tennyson, Browning and Arnold, to Rosetti, Swinburne and Morris, while a host of minor lights have shone between. The gradual change from mere archæological architecture to a style which cannot be labelled with the name of any preceding style since it partakes of the nature of all, is largely due to the stimulating and refining influence of this wondeful train of poetry. And it may be that only the end of the twentieth century will see the full development of what may be called the Romantic style of architecture since it owes so much to the Romantic School of Poetry.

The effects of poetry, which we have hitherto considered, have been more or less indirect, but one branch of poetry has had a most direct influence on architectural development, to wit, the drama. From this has sprung the long series of theatres, extending from the famous theatre erected at Athens in honour of the god Dionysus soon after 500 B.C., through all the theatres, and (indirectly) the magnificent amphitheatres, of ancient Rome and her wide-extended provinces, to the ornate theatres and opera-houses of modern cities. It must be confessed that the modern drama does not appear to have a beneficial influence on architecture; the reason is not far to seek—modern theatres are usually commercial undertakings, no more.

Poetry, however, *qua* poetry (with the exception of the drama) has really no directer influence on architectural development than the promotion of culture and the quickening of imagination. Poets' descriptions of architecture are almost invariably vague or incorrect, and quite useless as aids to design. Indeed, it is in their very vagueness that their beauty and stimulus inhere. There are few nobler lines than Coleridge's wonderful dream-fragment—

> "In Xanadu did Kubla Khan
> A stately pleasure-dome decree,
> Where Alph, the sacred river, ran
> Through caverns measureless to man
> Down to a sunless sea."

And yet, from an architect's point of view, how vague they are. Compare them with Thomson's careful description of Greek architecture, and little doubt will be felt as to whether this passage or that is more likely to gladden an architect with visions of noble buildings, and to inspire him with courage and patience enough to fix these visions everlastingly in stone.

> "First, unadorned
> And nobly plain, the manly Doric rose;
> The Ionic then, with decent matron grace,
> Her airy pillar heaved; luxuriant last,
> The rich Corinthian spread her wanton wreath—
> The whole so measured true, so lessened off
> By fine proportion, that the marble pile,
> Formed to repel the still or stormy waste
> Of rolling ages, light as fabrics looked
> That from the magic wand aërial rise."

The poet's business is not to catalogue the beauties of a building, or to make an inventory of its details, but rather to convey, clearly and forcibly, the emotions which the building excites in the heart of the beholder. Then most does it quicken the imagination of the architect.

Space, however, would fail if we were to enter into this delightful region of poets' architecture, and bare mention only can be made of the fact that the rulers who have shown the keenest appreciation of architecture have usually been lovers of poetry if not poets themselves. The names of Seti I. and Rameses II. in Egypt, of Assurbanipal in Assyria, of Pisistratus and Pericles in Greece, of Augustus at Rome, of Harûn-Ar-Rashid at Bagdad and Abdurrahman III. in Spain, of Cosmo and Lorenzo de Medici at Florence, of Francis I. in France, and many others, spring to mind as patrons both of poetry and architecture. The lover of poetry is likewise a lover of art.

G. L. S.

MEMORIAL TO THE LATE C. R. JACSON.

THIS memorial, in the form of a medallion portrait with emblematical figures in the angles of the framework, has been erected in the Harris Free Library at Preston. The sculptor is Mr. E. Roscoe Mullins, the architectural setting out is by Messrs. James and Arnett Hibbert, and the framework was executed by Messrs. Patteson of Manchester.

The portrait and the angle figures are executed in statuary marble; the two upper figures symbolise Virtues, and the two lower ones are angels in prayer. The framework is executed in giallo antico. The size of the whole work is 5ft. 4in. by 4ft.

As the photograph was taken a little from one side, showing the outer framework in perspective, and with no background of any kind, we have been unable to show the whole framework, as the strong vanishing lines of the dark marble edge on the white background would have had the effect of a crooked border; the reproduction shows the sculptural portion complete.

COMPETITIONS.

WEST HAM TECHNICAL INSTITUTE COMPETITION.—The Technical Instruction Committee of the West Ham Town Council will meet on the 20th inst., to consider the report of the assessor, Mr. J. Macvicar Anderson, F.R.I.B.A., with regard to the seventy-three designs submitted in this competition. The designs will be on view at the Public Hall, Barking-road, Canning-Town, E. (station, Canning-Town, Great Eastern Railway), from Saturday, September 21, to Saturday, September 28 inclusive, admission being by ticket, which may be obtained on application to the Town Clerk, Town Hall, West Ham, E.

SEWERAGE SCHEME, GREAT AYTON.—The Parish Council of Great Ayton and the Chairman of the District Council, acting together as the Parochial Committee, have for some time had under their consideration the subject of a thorough system of main sewerage for the village. To ensure the greatest efficiency they offered a premium of twenty-five guineas for the best competitive scheme, and, in response, five engineers entered into the competition. Mr. T. W. Stainthorpe, C.E. (the Engineer and Surveyor to the Eston Urban Council), was called in as adviser, and eventually the scheme by Mr. H. W. Taylor, of Newburn-on-Tyne, was adopted. Mr. Taylor's scheme is framed on an estimated cost of 2,990*l.* (including the plan of the Ives's patent system of filtration).—*Leeds Mercury.*

ARCHITECTURAL SOCIETIES.

THE GLASGOW ARCHITECTURAL ASSOCIATION.—A meeting was held on Tuesday evening last in the new rooms, 187, Pitt-street, when Mr. Alexr. McGibbon, architect, read a paper on "Motive and Material in Architecture."

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* Fergusson: "History of Architecture," i.

† Hallam: "Europe during the Middle Ages."

‡ Pope, it is true, translated both the Iliad and Odyssey, but he never entered into the sipirit of the Greek poetry. His translation has been styled "about the most un-Homeric performance in the whole compass of our poetry."—[Craik: "History of English Literature and Language, II."]

CHARLES ROGER JACSON
J.P. AND D.L. FOR THE COUNTY PALATINE OF LANCASTER.
ALDERMAN OF PRESTON AND MAYOR 1865-66.
CHAIRMAN OF THE BUILDING COMMITTEE OF THIS EDIFICE.
BORN NOV. 29. 1817 · DIED OCT. 3. 1893.
IN RECOGNITION OF WHOSE MANIFOLD PUBLIC SERVICES
AND HIGH CHARACTER.
THIS MEMORIAL
IS HERE PLACED A.D. MDCCCXCV

Memorial Tablet in Preston Free Library.—Mr. E. Roscoe Mullins, Sculptor.

The paper was a historical inquiry into the relative influence exerted on architecture by motive and material respectively. The former was considered the stronger, although in particular cases many times the nature and locality of materials dominated the style. Forecasting the coming condition, the essayist judged that whatever new materials may emerge, the materials that have gained favour in the past will never be ousted from their position, and the forms of the past will be perpetuated. Mr. George Copland opened the discussion, which was freely indulged in, and the customary vote of thanks was passed to the lecturer for his able paper.

DIATOMITE.

THIS is the name given to what several of our contemporaries have called a new material, which is now being used in fireproof construction, also for covering steam boilers, steam pipes, preventing damp and dry rot, isolating engine-rooms, glass making, and for antiseptic and kindred purposes. Diatomite from the island of Syke has recently been used in concrete floors at the offices of the *Glasgow Herald*, in such a manner as to call forth much commendation. But it is a mistake to regard it as a new material; it has only for the present been re-christened and put to new purposes. It is far better known under its German appellation, kieselguhr, or fossil meal. It may be described, shortly, as consisting of myriads of skeletons of extremely minute plants, which can only be seen by a high power of the microscope. These skeletons are entirely siliceous, and the particular form of silica resembles flint; it is not crystalline, or at least it does not display all the optical properties characteristic of quartz; but in general it is a very pure siliceous earth. Apart from the uses already alluded to, diatomite (or kieselguhr, as we should prefer to call it) would make a first-class fireproof brick where one of extreme lightness is required. The principal objection to such bricks is their comparative friability and softness. They are, as a rule, very absorbent, but are good fire-bricks for all that. They should be used only in positions where there is not much friction.

The material employed at the newspaper offices alluded to is a mixture of diatomite with concrete, and is designed to meet the necessities of modern fireproof construction—viz., strength, lightness, deadening sound between floors, and absolutely efficient resistance to the greatest heat possible in any warehouse fire, this being secured, says the patentee, after a long series of experiments and tests in the successful practical application in the composition of the concrete, &c., of a very high non-conducting material, now known to have been used by the Romans. It is stated that the present is the first instance since Roman times, however, that diatomite has been made practicable as a material for building construction. The test applied at experiments conducted at the office on the 11th inst. was a severe one. A slab of ordinary concrete and another of the new material, each 29 in. by 26 in. and 7 in. thick, were placed upon a smith's fire with double tuyere irons, and a powerful blast applied constantly for eighty minutes by means of two 30-in. bellows. After the concrete had been subjected to the blast for eighty minutes both slabs were removed from the furnace, and cold water thrown upon the surfaces which had been exposed to the heat. They were both afterwards struck with a sledge-hammer. The ordinary concrete yielded to the second blow, and it was found that the heat had penetrated $4\frac{1}{2}$ in. The diatomite slab did not break until the sixth blow, and in this case the heat had penetrated only $3\frac{1}{2}$ in.

Mr. Councillor Sinclair, who was present, remarked that, in consequence of the fireproof character of the new building, the proprietors had obtained a considerable reduction in the rates of insurance. The concrete of all the floors was mixed with diatomite.

From the above experiments we should think that this fireproof flooring will answer its purpose very well. There is always the danger, however, that such material will not answer so well on the large scale as on the small. When a "fireproof" building is subjected to a conflagration it frequently happens that the barrier is rendered useless from imperfect or incomplete construction. We shall be glad to learn that with its wider application diatomite is, in reality, all that is claimed for it.

We do not gather the extent of these deposits in the Isle of Skye. Diatomaceous earth (or ooze) is not particularly common, and there is not much of it in the British Islands. In Ireland it is forming on the borders of certain lakes at the present day, but the beds cannot be very thick. Its use is largely dependent on its relative purity, which is an unknown quantity in many instances. In the manufacture of fire-bricks it is not difficult to see that some of the German kieselguhr contains a fair proportion of iron. Samples of this compared with the material from the neighbourhood of Portree, are not quite so white as the latter, which could be easily mistaken for a form of amorphous lime, or powdered chalk at first sight. We are not personally acquainted with the Skye deposits, but an examination of the material would seem to point to a recent origin, such, for instance, as may be produced in bogs, at the present day.

Illustrations.

A NINETEENTH CENTURY ATTEMPT AT A LARGE CATHEDRAL.

THE two fine drawings under this title, by Mr. A. H. Skipworth, were exhibited at the Royal Academy this year.

As the design is a study merely, and there are no practical details to be given as to its execution, the author prefers to leave it to speak for itself, without any further explanation than the drawings themselves afford.

The subject of modern cathedral design is briefly considered in the first article in this issue, partly in reference to this design.

ABBEY GATEWAY AND THE NORMAN TOWER, BURY ST. EDMUND'S.

BURY ST. EDMUND'S is one of the places to which excursions were arranged in connexion with the British Association meeting at Ipswich. It may therefore be of interest to give illustrations of some of the Mediæval remains which form the chief interest of the place.

The two gateways of which illustrations are given are the most important of the remaining architectural features of Bury St. Edmund's. The two fine Churches of St. James and St. Mary afford good examples of Suffolk Perpendicular work, and the scanty remains of the great abbey church, which exist only sufficiently to enable its immense size to be inferred, render evidences of what was one of the most noteworthy of the ecclesiastical buildings of East Anglia. The old Norman synagogue, Moyse's Hall, recently restored and adapted to a modern use, has suffered in the process of adaptation.* While these buildings all afford objects well worthy of study, the two gateways have the advantage of at once arresting the attention of the visitor, not only on account of their great interest, but also by reason of the early date of the first of the examples, and the beauty of the workmanship of the other.

The Norman tower, now called "St. James's Gateway," and which serves as a belfry to the adjacent church, is a fine, bold Norman work, by far the most complete of all the gateways of the same date now remaining. While the examples at Bristol and Canterbury have lost their upper portions, here the walls are original at least up to the parapets. The battlements are modern, having taken the place of a crene-

* An illustration of the interior of this was given in the *Builder* for July 20 of this year, page 41.

lated parapet of fifteenth or sixteenth century date.

The primary purpose of the gateway was to give entrance to the west front of the abbey church, which was directly to the east. The precinct wall of the abbey ran left and right from the north and south walls. This fine gateway at present towers above the adjacent buildings and the steepleless church, and with the conical roof, which was doubtless the form of its original covering, it must have made an imposing composition with the enormous abbey church in the near background, the western steeple of which latter is well known to have been one of the most lofty in the kingdom. The view shows the south and the western faces, the latter being the principal one, abutting upon High-street. The porch, with its pedimented roof, is very similar to that of Kelso Abbey. In the absence of documentary evidence worthy of acceptance, the period of its erection may be safely assigned to about the end of the first third of the twelfth century. The height is about 75 ft. from the modern level of the ground, the width of the front being very nearly 40 ft. The work, considering its date, is in a remarkable state of sharpness and preservation, showing how carefully the Norman builders selected their stone.

The second gateway, which projects from the line of the Abbey boundary wall, indicates how marked and complete is the difference of design and workmanship between that of the twelfth century and the middle of the fourteenth, when this structure was erected. A former gateway was demolished during one of the dissensions between the monks and the townspeople in 1327, and its re-erection appears to have been moderately soon after that event.

The view, which shows the western, or entrance-side, from the town, indicates also the position of the Abbey wall, part of which remains. It is composed entirely of cut stone, and the work is executed in an admirable manner, which relieves what would be otherwise the somewhat monotonous effect of the repetition of parts over one another of almost the same size and design. The angle-shafts were carried up higher than the battlements, but in no case do they remain.

The gateway shown in the view opens into a vestibule, the modern portcullis being in the ancient grooves. A flat arch beyond it opens into the gateway proper, the walls of which, left and right, are panelled in the form of traceried windows; and having a roof vaulted with diagonal and intermediate ribs with bosses at the intersections. On the walls are the arms of Edward the Confessor, the Duke of Exeter, Brotherton, Holland, &c.

The large arch in the eastern face, which led into the Abbey grounds, has no sign of any gate or door.

On the first floor is a large apartment with a fireplace, the principal window of which opens in the eastern wall. The present height is about 66 ft., the length being 64 ft. from front to back, the width of the front being about 40 ft.

A STREET FRONT.

THIS is a design by Mr. R. W. Bedingfield which was exhibited at the Royal Academy last year. It shows rather a bold and unusual treatment in the introduction of the octagonal turrets to strengthen the angles and to act as buttresses or stops to the ranges of windows. It makes an effective house-front, though we fear it might present difficulties in regard to legal questions of projection beyond the authorised line of frontage of a street.

TRADE CATALOGUES, &c.

MESSRS. BOOTE & Co. send us a new and excellently got-up catalogue of their ornamental tiles for walls, floors, and hearths, printed in colour. The firm appear to make a special feature of the employment of mottled tiles of broken colour in many of their simpler patterns, and these seem likely, as far as one can judge from small-scale illustrations, to give a good and rich surface effect. The more decorative designs, many of which seem very good in colour harmony and form very pretty flower paintings on tiles, are nevertheless not what we call tile *design* in the true sense. Realistic flower painting on tile panels no doubt comes in well at times, and is popular with the public, but it is not decorative design from an architect's point of view. Messrs. Boote appear to have a fine range of colour and texture available in their materials; they should procure some designs from time to time from some of the first architectural or decorative designers of the day; they would probably find their account in it in the long run.——Messrs. John Bolding & Sons' catalogue "No. 5," includes prices and engravings of an immense variety of sanitary articles—closet-fittings, sinks, lavatories, baths, pumps, valves, boilers, &c. As in many other cases, the furniture articles in which cast-iron is employed, such as lavatory-stands, &c., would be much better for being simpler and with less attempt at being what is called "ornamental." In a practical sense the articles described and figured seem excellent. There are some special forms of housemaids' sink which deserve attention, and also of closets, especially the "Laydas" syphonic-action closet, which in every respect seems excellent, although we doubt if it is advisable to advertise that it "requires two gallons of water only." If the closet does not require more than that, the drain does.

CROSS IN CEMETERY OF TEAMPULL BRECAN, ARANMORE.

THE illustration of this cross is from an engraving in the published report* of the meeting of the Royal Society of Antiquaries of Ireland at Galway in July, in the course of which a number

Cross in Cemetery of Teampull Brecau, Aranmore.

of excursions were made to various places of interest in that part of Ireland, including Inismurray and the islands of Aran. Teampull or Temple Brecan is in the north island of Aran. The shaft of one and the fragments of two other crosses, of which this is one, remained in the cemetery. Apparently the fragments had been collected and set in position for the purpose of the illustration.

ST. MARY'S CHURCH, DEVONPORT.—This church, after extensive renovation, was reopened on Sunday last, the 15th inst. The whole of the upper part of the spire, which for years was in a dangerous condition, has been taken down and rebuilt. Mr. H. G. Luff was the honorary architect, and the contract was let to Mr. C. Gould, a London steeplejack and builder.

* Dublin: Hodges, Figgis & Co. London and Edinburgh: Williams & Norgate.

Correspondence.

To the Editor of THE BUILDER.

IRON AND CONCRETE FLOORS.

SIR,—Referring to your article last week in reference to concrete construction in America, and more particularly in reference to concrete and iron beams, I should like to point out that Mr. Ransome's American 1884 patent simply describes and claims the combination of twisted iron rods and concrete, and does not state the sizes of rods necessary or show that the size of rod makes any difference whatever to the hold of the concrete on the iron. Now it was shown by my experiments, reported in your issue of May 2, 1891, that round unstraightened rods, just as received from the rolls, and of $\frac{1}{16}$ in. diameter per foot of span, could be securely held by the concrete, and it is very doubtful to me if the hold of a twisted square rod is at all superior to this. It was the non-discovery of the increased hold to be obtained by using small rods that nullified Mr. Thaddeus Hyatt's experiments in 1877, and it was probably not until after the publication of my experiments, and calculations that Mr. Ransome was able to design his beams with any degree of certainty. Certainly, the general circular now issued by his firm bears evidence that they have studied my specifications. It is only through my experiments and calculations (published in my several specifications of letters patent 2,941, 1891; 1,415, 1892; and 15,466, 1894), which extend even to the minute distribution of the shearing stresses on the surfaces of the rods under various conditions, that concrete and iron beams can be accurately designed. It was the consideration of the distribution of these shearing stresses that showed the advisability of corrugating the ends of the rods as is done in all of my beams as now manufactured. Mr. Ransome has not patented his invention in this country, and I should certainly consider the use of twisted square rods to form concrete and iron beams an infringement of my patents, as it would be found necessary to use the twisted rods in exactly the same way, and of the same sizes as round ones. Although twisting improves iron, it would probably injure the steel that is used in my beams. FRED. G. EDWARDS.

THE LONDON BUILDING TRADES FEDERATION.

SIR,—The following paragraph was published in the *Daily Chronicle* of September 14, under the heading of "The Labour Movement":—

"The London Building Trades Federation has taken further action against the firm of Messrs. Smith & Sons, builders, of West Norwood, and yesterday at noon between fifty and sixty men, employed on works in progress at Upper Russell-street, Market-street, and Western-street, Horselydown, were called out. This action has been taken in order to compel the firm in question to conform to the terms of the agreement entered into in 1892."

This paragraph contains matter that is foreign to fact. The Building Trades Federation say that the action was taken to enforce the 1892 agreement. We have been no party to this agreement, or been consulted in the matter of extended radius, our works being beyond ten miles from London; and our firm belongs to the Croydon District Builders Federation, in common with the trade of the district.

We are paying, and have always paid, union rates of wages as applies to the old ten miles radius.

Is the *Daily Chronicle* aware that the agreement of 1892 has fallen through?

We strongly object to the arbitrary and unwarrantable interference of the Building Trades Federation, and are pleased to state that notwithstanding their action the works named are proceeding satisfactorily. JAMES SMITH & SONS.

S. Norwood, S.E.

INSTITUTION FOR BUILDERS' CLERKS.

SIR,—Why has not there yet been formed an institution on behalf of builders' clerks? The builders' foremen have an institution, clerks of works have an institution, then why not a builders' clerks' institution? I am quite sure that an institution formed on a good and solid basis would be of the greatest benefit to master builders as well as clerks, as none but *bonâ fide* builders' clerks should be allowed to join, and then those of good character and business abilities, so that builders should not be pestered with persons not competent for their work.

I should be most pleased to join some energetic men who would do their utmost to promote such a Society for their own and fellow-clerks' good. Of course there would be a host of difficulties to contend with, but that, I think, should promote greater energy to make such a society a success, as I believe that once properly "floated," it would soon enroll some thousands of members from London and the country. "A BUILDER'S CLERK."

P.S.—I have enclosed my name and address, and should be pleased to receive through you any communications on this subject.

The Student's Column.

METALS USED IN BUILDING.—XII.

HAVING described various ores of practically all the metals used in the building trades, and given some account of their modes of occurrence in Nature, we shall now treat more particularly of their alloys. As these latter are manufactured from a knowledge of certain physical attributes of the former under the influence of heat and other conditions, it will be useful, before commencing a systematic review of alloys, to state these physical properties, otherwise the student will hardly be able to grasp the effects of their combination.

ALLOYS:—GENERAL CONSIDERATIONS.

If all metals sold in the market and used in the preparation of alloys were pure, the metallurgist would find many of his most vexing problems easy to solve. But very few metals are unalloyed in Nature, and the market denomination in several important instances merely has reference to the predominating constituent. To reduce metals from their ores in a perfectly pure state is an operation that can often be carried out on the small scale in the laboratory, and in specific instances also, on the large scale—within limits. Speaking generally, however, such a standard of purity cannot be economically arrived at, and if it could, it is doubtful whether any really useful ends would be gained beyond simplifying the education of the metallurgist. When we speak of "lead," for instance, we include in that term, not only the element of that name, but various others, such as silver, iron, gold, sulphur, &c., all of which occur in small proportions in the lead of commerce. Chemically these are, of course, regarded a simpurities, but from the practical point of view, are not spoken of as such, unless present in considerable quantity. Just how much of another substance may be permitted to enter into the composition of a metal without being classified as an impurity in the commercial sense, depends almost entirely on the particular uses to which the metal is to be put, and as to how far the impurity impairs its general chemical and metallurgical behaviour.

The same remarks apply in a restricted sense to what are termed the several "qualities" of a metal. A substance that could not under any circumstances be allowed to exist in a bar, or pig, of one kind of metal, may be very desirable in another kind. Using lead, again, as an illustration, we may say that the amount of silver usually present in the ore when extracted, renders the former purer (to a certain extent) in the chemist's eyes, but when taken away it does not improve the appearance of the substance, for instead of being a bright metal it then assumes a dull leaden-grey colour. The builder, however, need not flatter himself that he ever sees lead or any other valuable metal used on the large scale for building purposes in a high degree of purity. For ordinary operations, iron pyrites, so commonly found associated with ores of lead, are suffered to remain in the pig, and are worked up with the rest in manufacturing. To be sure, the pyrites are attempted to be removed in dressing the ores, and some machines do the work remarkably well, so that there is nothing to complain of; but in the majority of cases the removal is only effected in a perfunctory manner, and the surface of the pig shows multitudes of minute fragments of that mineral, sometimes visible to the naked eye, but more frequently by the aid of a lens. The lead buyer understands these things perfectly well, and buys accordingly. Such an impurity would never do for many high-class purposes, but it may not matter in the least for others, prominent amongst which are numerous applications of the metal in the building trades. The student of architecture, however, should make himself acquainted with divers qualities of lead used, if only to control the price paid for articles made of them. Again, the presence of some of these impurities seriously impairs the durability of the metal; they affect its ductility, tenacity, and strength. When used for roofing, lining troughs, and the like, its tendency to "buckle" or otherwise must be kept in view; and the "flow" of the metal under pressure, as when used on treads of steps, must depend on its relative purity. But this is not the place to refer to specific uses of the metal, and we have said enough in illustration of our meaning.

Several metals are of value on account of their non-tarnishing properties. Some of these may contain a fair proportion of impurity without such properties being seriously interfered with, whilst others become affected in time. Of course, a great deal depends also on the form of the impurity, and its method of association with the metal. If the impurity were as untarnishable as the substance containing it, no harm might result, but such a case is of very uncommon occurrence. In general, most impurities would promote the action of oxygen, and lead to the surface being slightly tarnished, though only to the stage that would be called "dull"—unless the metal were absolutely worthless, a circumstance that would soon become manifested after the ornament, or fitting, had been fixed up.

So far, we have alluded merely to natural alloys the close alliance of the component parts of which are further strengthened in the majority of instances when their ores are being prepared for the market, unless some constituents are eliminated during the operation. We have no intention of describing metallurgical processes in detail, but as occasion arises they will be briefly alluded to. We may only say now that the particular kind of ore treated of at one mine, or at a series of mines in a locality yielding similar raw material, often leads to a specific variety of the metal which can for commercial purposes be differentiated from the ores of other localities. In course of time the behaviour of these different ores of the same metal become known to the practical metallurgist, and he is made familiar with their effects in combination with other substances, by experience. Further, the particular method adopted in reducing ores of the same character is a prime factor in the ultimate result obtained. Very pure metals are made by electrolysis, and for electrical and other special purposes, great care is exercised in their preparation. In the manufacture of steel the behaviour of all substances employed must be accurately known, so that one kind of steel suitable, say, for "cutting instruments" may be obtained where necessary, in contradistinction to another kind desired for girder purposes. There is very little, if any, guesswork in the preparation of such metals in high-class establishments. It is otherwise, however, in many foundries from which a large proportion of the metals other than iron and steel used in building comes. Those who direct these latter establishments often aim only at the production of a metal of tolerably homogeneous appearance that will pass muster on a general inspection. If the metal produced outwardly resembles another of a more costly nature we hardly like to say what might not be done with it. The multitude of so-called brass fittings used by the builder often reflect the impudence of the manufacturer who has foisted them upon the market — otherwise there is nothing brazen about them, save for the lacquer that does duty for the real article. There is little fear of lead-poisoning from certain "lead" pipes; and our forefathers would blush were they to see some of the miserable stuff that is called copper. These materials are "alloyed" with a vengeance.

There are thriving, in the neighbourhood of Birmingham and elsewhere, several founders who make small builders' (and other) castings from all sorts of rubbish known generically as "old metal." The student will be interested in their productions, which, we are sorry to say, are largely on the increase. No one thinks to order these fittings to be of a certain composition or strength, and the result in such hands may be better imagined than described. This "old metal" is made of practically anything,—filings, dust, shearings, parings, odd scrap, scalings, &c. —from all sorts of metals and alloys. Providing it will melt down and yield a fairly good casting, without many blow-holes being present, it is brought into requisition. The better kinds are derived from periodical sales of scrap and rough metal found in the Government dock-yards, and from the breaking-up of old vessels. Many of the founders using this class of metal possess no knowledge of metallurgy worth mentioning, and have to make experiments by rule-of-thumb in small crucibles to obtain any desired effect. Nobody could be more surprised than they at the results frequently obtained in this elementary manner. Sometimes these men are utterly at a loss to know how to get rid of their curious purchases. Instead of yielding the class of metal anticipated, the effect is perhaps an extremely brittle substance of no use to anyone. This has to remain on the premises, to be "worked off" as opportunity offers. At other times old metal is bought, on the understanding that it is of a certain character, though such a warranty naturally enhances the price. The class of founder alluded to will rarely contract to deliver castings of a definite strength; two things guide him, principally, viz., the colour of the metal produced, and its freedom from obvious flaws. Add to this another property—its readiness to take a "dip." Colour, strength, hardness—everything, has frequently to yield to that. The founder in this case may produce practically anything, and it will find a market if it can only be cleanly turned and finished, and presents a suitable surface to take a metal dip. The latter must be taken on evenly and homogeneously, otherwise the casting is of no use. It is right that the student should be made aware of the existence of these sham materials. As a rule they are brittle and worthless; they will not stand much wear and tear, but are often sold at the same price as the better class of goods they are spurious imitations of.

We do not imply, of course, that all buyers of old metal, manufacture "alloys" of the kinds just described. On the contrary, certain old metals are often superior to modern ones of similar description, and are brought into the highest uses, and rightly so. But the purchasers understand them, and use them accordingly. They bear a correct designation in the market, and there is nothing underhand in their production. We said just now that the low-class mixed-metal founder does not, as a rule, understand much of metallurgy. Some, however, are possessed of sufficient knowledge to add specific metals to "improve the pot," and are aware of the general conditions which lead to the strengthening of the whole. If the resulting cast is brittle they, at any rate, stand a chance of being able to improve upon it within certain limits. As an accident, a few of these compounds have turned out to be truly valuable alloys, and, their real nature having been properly investigated, they take their stand as such.

It is with feelings of relief that we turn from the consideration of alloys produced by a species of jugglery to those of a definite character, resulting from a more or less intimate knowledge of the laws which regulate the union of metals. The subject is by no means perfectly understood, but a great mass of useful information is available to those who care to search for it. Metals are rarely used in their free state; when in that condition they are often too soft to successfully resist wear and tear, and their general range of practical utility is enormously widened by the addition of other substances which may improve or otherwise modify their physical properties. Moreover, the cost of the more valuable metals is lowered by judicious admixture. Silver is both hardened and improved for use by a slight addition of copper, and so is gold. Brittle metals may be rendered tough, highly ductile ones may have their properties in this respect curbed, casting attributes may be vastly improved, and so on, by being properly united with other metals.

It is a doubtful point as to whether alloys are true chemical compounds or not; if some of them are not, then the difference must be of an extremely subtle character. Certain it is that definite compounds do exist in definite proportions by weight in the natural as well as the artificial state. It may be admitted that the majority of metals are capable, to a certain extent, of existing in a state of chemical combination with one another, but that the union is a very feeble one. Several metals only remain in union within certain ranges of temperature. In 1863 Matthiessen showed the probability that the condition of an alloy of two metals in the liquid state might be either that of—(1) a solution of one metal in another; (2) chemical combination; (3) mechanical mixture; or (4) a solution or mixture of two or all of the above; and that similar differences may obtain as to its condition in the solid state. However that may be, it is quite clear that several alloys have at least one constituent partly, if not wholly, existing in the mechanical state, for it may be seen with a lens; and it is equally certain that, in effect, the constituents of other alloys appear to be chemically combined. Practically, the whole subject of alloys rests on an appreciation of the state in which the component parts of the mixtures exist; on that, strength, hardness, malleability, ductility, and nearly all the prime physical properties of the metals must largely hinge. The microscope is now being vigorously applied to throw light on this crucial point, and, so far, the results are very encouraging.

GENERAL BUILDING NEWS.

NEW CENTRAL POLICE OFFICE, ABERDEEN.—These buildings, which occupy the site of the former prison in Lodge-walk, are now finished. The front building is a two-story one of Aberdeen granite in hammer-blocked ashlar work with close-picked dressings. The frontage to Lodge-walk measures 155 ft., and the height of the building is 50 ft. There are three entrances, the main doorway being in the centre. The ground-floor accommodation includes

record-room, property-room, telephone-room, lieutenants' room, waiting-room, charge-room, two detectives' rooms, and inspectors' room. There is also a muster-room, measuring 58 ft. by 31½ ft. On the first floor are magistrates' room, chief constable's room, clerk's room, agents' room, surgeon's room, &c. The police and burgh court-room is also on this floor; it measures 35 ft. by 28 ft., and is 20 ft. in height, with panelled ceiling. There is a large projecting cornice supported by enriched truss blocks. At the back of the magistrates' bench are carved pillars, framed panels, and canopy in woodwork, with the royal coat-of-arms on the top, supported on carved trusses. There is ornamental and obscured glass in the windows having the city arms embossed, and there are numerous electric lights in the court-room. For the use of the constables there have been provided, in a south wing behind, a reading-room and library, and also a gymnasium hall, 33 ft. by 32 ft., having gallery at one end, with dressing-room and bath-room over reading-room. The north wing at the back is a two-story cell block, with separate accommodation for males and females. There are thirty-six cells, each 10 ft. long by 6½ ft. wide, built with enamel brick to a height of 5 ft., the upper portion being finished with Keene's cement all round. A detached building contains mortuary and dissecting-room, stable and coachhouse. The main building is connected with the municipal buildings by an overhead gangway. The whole buildings are finished in pitch pine varnished, and lighted by electricity. There is a complete system of telephone communication, and the rooms and lobbies are covered with cork carpet. The plans were prepared by Mr. John Rust, jun., city architect, Aberdeen, for whom Mr. Napier acted as inspector of works. The contractors were:—Mason work, G. Duguid; carpenter work, Hendry & Keith; plaster work, J. Bannochie & Sons; plumber work, Thom & Strachan; painter and glazier work, Masson & Son; heating and electric lighting, Shirras, Laing, & Co.; slater work, Mr. Morren; grates, &c., Florence & Son; cabinet fittings, Ogilvie & Sons; all of Aberdeen. The original building contracts accepted amounted to 12,700*l.*

OLD MARKET CROSS, PEEBLES.—After various vicissitudes this old cross, or rather what remains of it, has been re-erected on the site it originally occupied at the head of the Northgate, Peebles. When first built the cross consisted of an octagonal shaft of stone, surmounted by a sun-dial having four faces, bearing at the corners the date 1699. In the year 1807 this was taken down on account of its ruinous condition, but the shaft was subsequently preserved in private grounds at Kingsmeadows. In 1858 it was erected in the quadrangle of the Chambers' Institution in the town, again pulled down, and has just been restored to its former position. As now built the remains of the cross stand on a pedestal 9½ feet in height, which pedestal has four ornamental panels, bearing coats of arms, with a fluted frieze and moulded cornice. An old record states that the shaft of the cross was in existence prior to the year 1320.

BIRMINGHAM.—Messrs. Barrow have in course of erection new premises, consisting of stabling, van-houses, covered-yards, dwelling-house, &c., situated in Dalton-street, on the Birmingham Improvement Scheme area. The dwelling-house will face the street, and will have red brick facing and terra-cotta ornament. The total cost of erection will be about 2,600*l.* The architect is Mr. J. S. Davis, and the contractor Mr. Thomas Rowbotham, both of Birmingham.

EDINBURGH BUILDING TRADE.—At the Dean of Guild Court, on the 12th inst., there were twenty-seven applications and certificates to erect new buildings and to make alterations on existing buildings. Thirteen were granted. The warrants for the erection of new buildings included—To the Governors of George Watson's Hospital for a pavilion at Colinton-road; to Mr. P. Mackenzie for a self-contained dwelling-house at Blackford-avenue; to James Turner for two four-story tenements at Wardlaw-place; to St. Cuthbert's Co-operative Association for a tenement in Georgie-road; to Free Church Temperance Society Trustees for new buildings at 7, 8, and 9, North Bank-street.

TECHNICAL SCHOOL BUILDINGS, STAMFORD.—The new Technical School, erected in Broad-street, Stamford, was opened last week by Sir John Thorold, Chairman of the Kesteven Technical Instruction Committee. The building is a stone structure, erected by Mr. John Woolston, contractor, Stamford, from plans by Mr. C. Traylen, of the same town. When furnished, it is estimated that the total cost will be 1,500*l.* The money has been jointly contributed by the Stamford Town Council and the County Council for the parts of Kesteven; the site was given by the Corporation of Stamford.

ST. GEORGE'S (NEW) COLLEGE, WIMBLEDON.—This building, opened a few days ago, is designed as a large private school. It is in the Gothic style, the elevations being mainly constructed of red brick and Portland stone. Independently of a suite of class-rooms sufficient to accommodate 250 boys, provision has been made for about fifty resident pupils. That portion of the building facing Worcester-road has been set apart for the head-master's private use, and consists of drawing and dining rooms, study, and extensive offices, together with fourteen bedrooms. Situated in the centre of the building is a large hall, 30 ft. high, capable of seating 300 to 400 people, and radiating from this hall are the numerous class-rooms mentioned above. On the first floor above the class-rooms, which is approached by two stairways, there are five dormitories, each with an average floor-space of about 400 ft.; on this floor is also lavatory accommodation for forty or fifty boys. Iron has been used between all the dormitories and passages in lieu of lath and plaster, as a safeguard against fire. At the rear of the building a practical workshop, fitted with carpenter's bench, lathe, &c., together with an excellent laboratory, has been provided. The heating and sanitary arrangements have been carried out by Messrs. T. Potter & Sons, of Oxford-street. The architect is Mr. Latham Withall, of Old Jewry, and the contractors Messrs. Truman Stevens, of South Molton-street, W.

ROMAN CATHOLIC SCHOOLS, HARROGATE.—The memorial stone of the new Roman Catholic schools in connexion with St. Robert's Church, Harrogate, was laid on Tuesday, the 17th inst. The edifice will be built of red brick with stone dressings, similar to the church, and is planned to accommodate 318 children. The buildings, which are from the designs of Mr. E. Goldie, of London, are estimated to cost about £3,000.

CARDIFF EXHIBITION BUILDINGS.—At a meeting of the executive council of the Cardiff Fine Art, Industrial, and Maritime Exhibition, held on Monday last, the 16th inst., in the Town Hall, a provisional contract with Mr. Gibbon for the erection of the exhibition buildings for 7,774*l.* was confirmed. The buildings have to be finished within four months from the date of commencement.

ST. GEORGE'S CHURCH, CWMPARC, RHONDDA VALLEY.—The memorial-stone of this new church was laid on the 17th inst., the service being conducted by the Bishop of Llandaff. The cost of the edifice, which is estimated at 4,000*l.*, is being defrayed by Mrs. Llewellyn, of Baglan, near Neath, who three years ago built, at her own expense, St. Peter's Church at Pentre, Rhondda, the edifice and the organ costing 25,000*l.* Two other large churches are being built at her expense in the Welsh coal-mining districts at the present time.

IMPROVEMENTS AT CARLISLE.—The *Leeds Mercury* states that the Town Council of Carlisle has, after brief discussion, decided to apply to the Local Government Board for a provisional order to acquire under the Lands Clauses Act, a large quantity of land and cottage property in Bridge-street, Caldergate, for the purpose of improving the entrance to the city from the west. The cost of the scheme was estimated at 12,000*l.*, but it is believed that it will ultimately reach 20,000*l.* This scheme will complete the series which have been devised for improving the approaches to the ancient city. At present the Corporation is busy opening out Lowther-street and providing a new entrance to the city from the north, which will be a great improvement upon the old approach by Rickergate Brow; and upon that scheme they are spending upwards of 16,000*l.* There is a fine entrance to the city from the east by Warwick-road, and the entrance from the south, with the court-houses suggesting to some extent the old citadel, is familiar to everybody who has visited the city. The Corporation has been some time at work in the reconstruction of the Irish store cattle market, and one of its recent acts is a determination in the course of a couple of years to take down an old row of houses and shops in the Market-place called Glovers'-row. This improvement has been discussed for half a century.

BAPTIST CHAPEL, PENARTH, GLAM.—Last week the foundation-stone of the Baptist chapel being built in Stanwell-road, Penarth, was laid. It will accommodate nearly 600 persons, and the front is to be of Newbridge cuttings, with Bath stone dressings, and the sides of local stone. The interior ends will be circular, with a gallery at one extremity, whilst a corridor will connect the present structure with the schoolroom near by. The edifice is estimated to cost 3,080*l.*; the architects are Messrs. Jones, Richards, & Budgen, of Cardiff, and the contractor Mr. Thos. Bevan.

POST OFFICE BUILDINGS, WOLVERHAMPTON.—The new post-office buildings at Wolverhampton, which are estimated to cost 12,000*l.*, are being rapidly proceeded with. The *Wolverhampton Chronicle* understands that the general style is French Renaissance, and that the area covered by the building will be 1,704 yards. The frontage to Lichfield-street will present the most imposing elevation. The largest rooms in the building will be the public office and the sorting-room, which are both on the ground floor. The former is 51 ft. long by 30 ft. 6 in. wide; it will have counters on two sides. Leading out of the public office at the east end is a telephone-room, 13 ft. 10 in. by 8 ft., the postmaster's-room, strong-room, and chief clerk's office. At the west end, the sorting-office, which is 85 ft. by 36 ft., is situated. Since the original plans were decided upon an addition to this office of 38 ft. by 25 ft. has been directed, and the room is now shaped like the letter L. Immediately adjoining it is to be a loading platform for the mail-carts. On another side are the delivery-room, 28 ft. by 20 ft.; boys' kitchen, 23 ft. 6 in. by 20 ft.; postmen's kitchen, 24 ft. by 16 ft., &c. In the yard is a shed for the trucks used for parcels' post work. On the first floor, in the centre over the public office, is the instrument-room, practically the same size as the office just named. The floors throughout will be of Portland cement concrete, the public office and main entrances being paved with York flags, the offices with wood blocks, and the yard and areas with Stuart's granolithic paving. The roof principals are constructed of steel, and these, with the remainder of the girders and steel joists used, are supplied by Messrs. E. C. & J. Keay, of James Bridge. The public office, sorting-office, and the instrument-room will be heated by low-pressure hot-water system, and the offices by Galton's ventilating grates. The building will be faced with Partridge's red-pressed facing bricks from Kingswinford, and the terra-cotta dressings, &c., come from the works of Mr. Dennis, Ruabon. The roof will be covered with Tilberthwaite green slates. The architect is Mr. Henry Tanner, of Her Majesty's Office of Works, London, and the builder Mr. Henry Lovatt, of Wolverhampton.

OPENING OF THE BURT HALL, NEWCASTLE-ON-TYNE.—The large edifice to be known as the Burt Hall (after Mr. Thomas Burt, M.P.), Newcastle, was opened on Saturday last, the 14th inst. It is to be the home of the Northumberland Miners' Mutual Confidence Association, and stands in close proximity to the Medical College. The *Newcastle Daily Chronicle*, in describing the building, states that it is on two floors, and occupies an area 117 ft. by 53 ft. Externally, the walls are faced with red Leicestershire bricks, with stone dressings from Brunton and Dunhouse quarries, and part dressings of terra-cotta; the roof is covered with green Westmorland slates. The Northumberland-road front has an oriel window, entirely of stone, and is completed by a gable, on the summit of which stands a representation of a miner taken from Mr. Ralph Hedley's picture, "Going Home." In the centre of the gable is the Northumberland County arms, and on each side of the oriel are niches. A wide corridor runs the length of the main building, and off this are the waiting-room, offices for president, secretary, and treasurer, stores, &c. The staircase to the upper floor is entirely of oak. On this floor is the hall for the meetings of the delegates, a room, 48 ft. by 26 ft., and lofty. The oriel window has six panels, with medallions bearing symbolic designs. On this floor there are also a committee room and a large room to be used as a library. The remainder of the buildings comprise residences for the secretary and treasurer. The general heating is by steam; but, in addition, there are fire-places to all the rooms, but not in the hall. The general contractor is Mr. S. B. Burton; the plumbing is by Mr. Stephen Percy; the slating by Mr. John Hewitson; the plastering throughout is in adamant; the window casements and heating apparatus by Messrs. Ashwell & Nesbit; the painting by Mr. John Gibson; the terra-cotta, faïence, and sanitary fittings by Messrs. Doulton & Co.; the electric lighting by Messrs. R. J. Charleton & Co.; the lead glazing by Mr. J. G. Baguley; and the special fittings and furnishings by Messrs. Robson & Sons. The whole of the works have been designed by Mr. John W. Dyson, architect, of Newcastle; Mr. Councillor W. Flynn, of Gateshead, has acted as the clerk of works.

MUNICIPAL TECHNICAL SCHOOL, BIRMINGHAM.—This building, which is now approaching completion, will be opened very shortly; that portion to accommodate students for the winter session commencing at the end of September, will be ready in a few days. It will probably be one of the largest and best equipped technical schools in the country. The *Birmingham Daily Gazette* says that the building occupies an area of 3,000 yards, and is built in the English Renaissance style, with bold gables and mullioned windows. Red brickwork and buff terra-cotta have been used in the construction. In the basement are the engine-rooms, in which are placed three large and powerful engines for generating electricity for lighting and motive power; there also is the foundry and stamping shop, the heating apparatus, &c. The iron and steel shop, which is near the engine-room, is a large compartment fitted with furnaces, muffles, and all the necessaries for full instruction in these branches of manufacture. The pattern shop is in a detached building. In a main corridor are the brass and metal shops, which have a frontage of 120 ft. The mechanical laboratory contains testing machines and other mechanical appliances, and adjoining it are the lecture and preparation rooms. In the front portion of the building is the laboratory for electro-metallurgy and bronzing, the practical lecture-room, preparation, battery, and dynamo rooms, and on the east wing are the carpenter's shop and a suite of rooms connected with the metallurgical department. Many others are devoted to physics and chemistry and applied physics, and there are apartments for the professors of the various sciences. The second floor is devoted to class-rooms for the women's department and large rooms for the teaching of geometry. The back wing contains a series of rooms to be used in connexion with the chemistry department. In all, the rooms for the teaching of the many subjects number 116. On the left of the main entrance are the administrative rooms, which consist of secretary's office, clerk's rooms, the principal's and committee rooms; and the apart-

ments above are reached by a wide staircase. Much care has been devoted to the decoration of the large examination and assembly room on the ground floor. A high dado of glazed bricks of grey tints runs round the walls, and are ornamented above by works in terra-cotta of a better quality than that used in other parts of the building. The front of the school facing Suffolk-street is largely constructed of terra-cotta, with panels of the same material having figures and groups emblematical of science and industry, and over the central doorway the arms of Birmingham stand in bold relief. A large balcony ornamented with huge griffins, runs round the front and sides of the building, to be used by students, in case of an outbreak of fire. The cost of erecting and fitting up the whole building is estimated at 88,558*l*. The work was commenced in October, 1893, from the plans of Messrs. Essex, Nicol, & Goodman, and Messrs. Sapcote & Sons are the builders.

INFECTIOUS HOSPITAL, PAIGNTON.—Designs for an infectious diseases hospital have been prepared by Mr. J. Stansfield Brun, surveyor to the Urban District Council, and submitted to the Local Government Board, who have requested the Council to send a deputation, with its surveyor, and the medical officer of health, to London, to confer with the Local Government Board on the subject.

SANITARY AND ENGINEERING NEWS.

NEW BRIDGE OVER THE ABERDEENSHIRE DEE.—There has just been opened for public traffic Maryculter Bridge at Milltimber, about seven miles from Aberdeen. It is a steel girder bridge, of three spans, with two masonry side arches, and two piers in the river, built of masonry. In all there is a clear waterway of 232 ft. and the roadway is 20 ft. wide. The bridge has been constructed for a uniformly distributed live load of 112 lbs. per square ft., and for the heaviest traction engine traffic. The roadway is paved with small granite blocks. The bridge was designed by Mr. James Barron, C.E., Aberdeen, and the cost, including approaches, has been 5,600*l*.

NORTHAM (DEVON) WATER SUPPLY SCHEME.—The Northam District Council was occupied on Saturday last, the 14th inst., in considering a scheme for a water-supply to the district, presented by Mr. Baldwin Latham, C.E. The engineer remarked that the population of the parish in 1891 was about 5,000, and as it was increasing it would be necessary to get a supply sufficient for future needs. The elevation of the district was very variable. There would be no difficulty in supplying Westward Ho! Orchard Hill, and Appledore by direct gravitation, but it would be difficult to get a water-supply sufficiently near to reach the higher parts of Northam by gravitation. The strata appeared to be of Carboniferous age, and very much disturbed. He had marked five sites as collecting areas, but one at the south of Ridford Farm, Abbotsham, would be most suitable. It had a collecting area of 120 acres, and there was no habitation within this ground. One great advantage was that there were no mill rights. He proposed to have an impounding reservoir on the site of the collecting area. This would be sufficiently high to supply Orchard Hill, part of Northam, the whole of Appledore, and the whole of Westward Ho! by gravitation. In order to make economical waterworks it would be necessary to get an intermediate distributing reservoir at a point along the pipe-track at the 200 ft. contour. This would enable smaller pipes to be used, and would be more economical. At this point they could have small pumping plant to send water to a high-level reservoir, to supply the more elevated parts. After a prolonged discussion it was resolved that Mr. Latham should supply plans and estimates for the work.

ELECTRIC LIGHT INSTALLATION, AYR.—The works which are to supply the town of Ayr with the electric light are almost completed. The *Scotsman* states that the generating plant is built in a large central station on the south bank of the river running through the place, and the buildings include power-house, boiler-house, and offices. The principal feature is the power-house for containing the generating machinery, which is a spacious building and well lighted. The power is supplied by two boilers, working at a pressure of 125 lbs. when condensing and 140 lbs. when non-condensing, fitted with mechanical stokers, each being capable of supplying 200 horse-power. The high-tension alternating system has been adopted. To generate the current, there are four sets of engines in the power-house, the two principal engines each driving a 100 kilowatt alternator, by Siemens & Co., of Woolwich, which gives 50 amperes at 2,000 volts at terminals. The principal machines are capable of supplying light to the amount of 6,600 eight-candle lamps, and a 50 horse-power machine 850 eight-candle lamps. The total amount of light to be given is thus nearly 70,000 candles. It is contemplated that the plant may also be used to work a tramway between Burns Monument and Prestwick through Ayr, a distance of about six miles.

WATER-SUPPLY WORKS, LEICESTER.—The new water-works at Swithland being constructed in the valley at the foot of Buddon Wood are now well in hand. The first sod was turned about four months since, and the other day the members of the Water Committee of the Leicester Corporation paid a visit to the site to inspect and report on the progress made. They found that two-thirds of the work had been accomplished, and hope the formal inauguration may take place next July. When the reservoir, which will cover 200 acres, is complete, Leicester will be in possession of three sites for water storage, viz, Thornton, Cropstone, and Swithland, equal to a total storage of 1,400,000,000 gallons, sufficient for a population of 300,000. The new works are being carried out by Messrs. J. Aird & Sons, from the designs of Mr. J. B. Everard, C.E.

STAINED GLASS AND DECORATION.

ST. MARY, CRUMPSALL.—A two-light window in this church has been fitted with very elaborate painted glass. One light contains a figure of Isaiah and a panel beneath, "The Vision of His Prophecy," "Behold, a Virgin shall conceive and bear a Son." In the other light is depicted Daniel, and below, the subject of his interpretation of Belshazzar's dream. This window is part of a scheme for the windows of the north aisle, to be executed by the same artists, Messrs. Percy Bacon & Bros., of London.

ARDLEIGH, ESSEX.—The decoration of the chancel of this church, commenced last year as a memorial to the late Canon Perry, has just been completed—the artists being Messrs. Percy Bacon & Bros., who worked under the instructions of the architect, Mr. E. Geldart.

FOREIGN AND COLONIAL.

FRANCE.—It is announced that the painter Roybet, and the sculptor Chaplain, have gained the large gold medals at the Exhibition of Fine Arts, at Berlin. MM. Boldini and Alexander Harrison have gained secondary gold medals.——The Department of Public Works in Paris is now making a new bridge across the Canal Saint Martin, between the Place de la Bastile and the Pont Mazas. It will be opened for traffic next year.——The sculptors, Hugues, Geoffroy Dechaumes, Fagel, and Lefèvre, have been commissioned to execute alto-reliefs representing workings in wood, iron, and stone, electricity and navigation, for the decoration of the façade of the new Mairie of Ivry-sur-Seine. M. Lefèvre has also been commissioned to execute a pediment sculpture representing the town of Ivry seated on a symbolical vessel.——To-morrow, September 22, the new Cathedral of Gap is to be inaugurated, which was commenced twenty-nine years ago. It is a building in the Romanesque style.——A committee has been formed to erect a monument at Bazeilles, commemorating the brave defence of that town in 1870. M. Thomsen, second Prix de Rome, has been commissioned to execute this monument, which is to be placed at the entrance of the town, opposite the house which Alphonse de Neuville has taken as the subject of his well-known picture, "Les Derniers Cartouches."——It is announced that the Hotel of the Sous-Préfecture of the Château Chinon is to be rebuilt.——A quay of 300 mètres in length is to be shortly commenced at Bayonne, on the left bank of the Adour. It is for seagoing ships. The expense of the construction is estimated at a million francs.——The Government has just offered a sum of 528,000 francs for the rebuilding of the Lunatic Asylum of La Châtité (Nievre), which will be considerably enlarged.——The town of Montdidier has opened a competition for the rebuilding of the Hôtel de Ville, the expense of which is estimated at 200,000 francs.——The jury of the open competition for the building of a Salle des Fêtes at Cateau (Nord) has awarded the first prize to M. Dehaudt, architect, of Lille. The second prize has been given to M. Chérier, architect, of St. Quentin; and the third prize to M. Dutouquet, architect, of Valenciennes.—The International Exhibition of Fine Arts at Cannes will open on October 15, on the Boulevard de la Croisette.——We are informed of a new act of vandalism on the part of the Municipal Council of Cambrai, who have decided on demolishing the Porte Notre Dame, a most original triumphal arch of the Renaissance period, with a very rich decoration. The Municipality of Douai, on their part, have voted the destruction of the Tour Saint Eloi, a curious monument of the fourteenth century, because it is not on a line with a new boulevard.——The Government will shortly commence the work of enlarging the quays at the Dieppe harbour, the expense of which is estimated at 2,237,000 francs, also the enlarging and lengthening of the jetty north of the Port d'Alger. This latter will cost about 850,000 francs.——The death, at the age of eighty-nine years, of M. Louis Adolphe Salmon is announced. He was a copper-plate engraver, pupil of Ingres and Henriquel-Dupont. M. Salmon had obtained in 1834 the Prix de Rome for engraving. He had received medals at the Salons of 1853, 1857, 1859 and 1863, he had also received the Legion of Honour at the Exhibition of 1867. He was also a very good water colourist.——We have also to record the death of M. Jules Ernest Sylvestre, painter and engraver, pupil of MM. Hébert and Luc Olivier Merson, who has just died in the National Asylum at Vincennes.

MISCELLANEOUS.

CHANGE OF ADDRESS.—Messrs. Jones & Attwood, of Stourbridge, announce that they have removed their London offices from 110, Cannon-street to 35, Old Queen-street, Westminster, S.W.

A LONG SERVICE.—Mr. John Spratt, a clerk in the employ of Messrs. William Cubitt & Co., builders, Gray's Inn-road, London, on Thursday last completed fifty years' service with the firm. During the whole time he has been in their employ he has never been absent through illness. As a memento of the occasion, the staff presented him with an address, accompanied by a very handsome clock and bronzes.

CHANGE OF ADDRESS.—Messrs. Messenger & Co., horticultural builders and heating engineers, of Loughborough, inform us that they have this week removed to more spacious business premises recently erected by them near the L. & N.-W. railway station in that town. The new buildings occupy an area of about two acres.

A PNEUMATIC FIRE ALARM.—The Franklin Institute has lately awarded a premium and medal to Mr. Albert Goldstein for his pneumatic fire alarm telegraph system, a description and report upon which, by the committee on science and arts, will be found in the *Journal* of that Institution for last month. The device is entirely pneumatic and mechanical, and embodies a magneto-electric machine for the transmission of the telegraphic alarm to the head-quarters of the fire brigade. It consists essentially of three parts, namely, a thermostat, which acts under the influence of a fire near it; an annunciator, which receives the alarm from the detector or thermostat, and indicates it by causing a bell to ring; and a transmitter, which is also actuated by the thermostat, and transmits the alarm by wire to a pre-determined station. The thermostat is composed of a small cylinder, in which is a washer of asbestos coated with paraffin. Beneath this washer a loose-fitting piston is placed, immediately above a spiral spring, held in compression by a rod, the lower end of which is only retained in place by two halves of a disc held together by a solder capable of melting when the surrounding temperature rises above 150 degrees Fahr. When the thermostat is subjected to this temperature, the two halves of this disc part, releasing the rod and the spring, which, by their rapid upward movement, cause the piston to drive the air in the cylinder through a pipe, and thus produce a corresponding impulse upon a small bellows or diaphragm in the receiver, by means of which a bell is set ringing, and at the same time the room where the fire exists is indicated. The system in question, both in its conception and simplicity, shows that much thought has been spent upon it, and in consideration of this, and of the beneficial results demonstrated by numerous practical tests, the Franklin Institute have deemed the inventor deserving of the reward above referred to.

KIRKSTALL ABBEY—A PUBLIC PLAYGROUND FOR LEEDS.—On Saturday last, the 14th inst., Kirkstall Abbey and grounds were dedicated "a playground for ever for the citizens of Leeds." A large portion of the picturesque ivy that once adorned its walls has been torn down under the plea of restoring, or rather repairing, the masonry. New pieces of stonework have been inserted at odd corners. The result, says the *Newcastle Daily Mercury*, is "not altogether pleasing to the eye, and there are some things, perhaps, which might have been avoided." Of course, "broad gravel walks bordering trim gardens" have been laid out where the artisans and their families who reside in the immediate neighbourhood in great numbers may henceforth take their pleasure.

MEMORIAL TO BISHOP HARVEY GOODWIN, CARLISLE CATHEDRAL.—This memorial, which has been placed in position in one of the bays of Carlisle Cathedral, was unveiled by the Archbishop of York on Tuesday last, the 17th inst. It consists of the bronze statue of the bishop by Mr. Hamo Thornycroft, R.A., exhibited at the Royal Academy this year, placed beneath a carved oak canopy in the Renaissance style, designed by Mr. Waterhouse, R.A. The late prelate is represented as lying in a recumbent position, attired in episcopal robes, with the hands joined above the breast and pointing upwards; the feet resting against a rock, behind which stands the episcopal mitre. Around the head of the figure is a group representing cherubs. In the central panel at the back of the canopy is a suitable inscription, the joint effort of the Master of Trinity and Mr. Ruskin.

EXHIBITION OF PLUMBERS' WORK, DUMFRIES.—The exhibition of plumbers' work in connexion with the Scottish Congress continues to attract attention. On Saturday last, the 14th inst., Sir Stuart Knill, Master of the Plumbers' Company, delivered an address to the younger members of the craft present, exhorting them to be thorough and earnest in their work. Sir James Crichton Browne hoped that County Councils generally would afford material support to the teaching of plumbing as a branch of technical education.

CAPITAL AND LABOUR.

THE *Labour Gazette* remarks that during the past month the building trades were well employed, and the percentage of unemployed members of

CONTRACTS AND PUBLIC APPOINTMENTS.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Police Station, Markinch, Fife	.....	D. Henry	Sept. 21
Hospital	Crewe Corporation	G. E. Bolshaw	Sept 24
Rebuilding the King's Head Inn, Doncaster	Hewitt Bros.	H. Athron	do.
Pipe Sewer (18 in.)	Guiseley (Yorks) U.D.C.	A. E. Preston	do.
Guernsey Granite Road Metal	Southampton Corp.	W. B. G. Bennett	do.
*Making-up Roads	Tottenham U.D.C.	P. E. Murphy	do.
*Road-making Works, Bowness-road	Lewisham Bd. of Wks.	*Official*	do.
*Road-making Works, Jutland-road	do.	do.	do.
*Surface-Drainage Works	Bromley U.D.C.	do.	do.
Additions, &c. to Rectory, Workington, Cumberland	J. Potts	Willink & Thicknesse	Sept. 25
Intercepting Sewer, Blackburn-road, &c.	Oswaldtwistle (Lancs) U.D.C.	R. N. Hunter	do.
Brick Sewer, Moss-street	Rochdale Corp.	S. S. Platt	do.
Twelve Artisans' Dwellings, Spa-road, Bolton	Lancs. & Yorks. R. Co.	H. Shelmerdine	do.
Walling and other Work, Pengam, Glam.	Gelligaer and Rhigos R.D.C.	W. Bevan	do.
House, Roller Shed, Offices, &c. Fanny-street, Cathays	Cardiff Corporation	W. Harpur	do.
*Broken Granite	Kingston-on-Thames Corp.	*Official*	do.
Sewering, Draining, &c. Piper-road	do.	do.	do.
Filter Beds and Storage Works, Dowdeswell	Cheltenham Corp.	do.	Sept. 26
Three Villas, Wellington-road, Maldon	.....	P. M. Beaumont	do.
Four Cottages, Bentinck Colliery, Kirkby-in-Ashfield	S. Watson	.....	do.
*Ventilating Town Hall, &c.	Longton Corp.	J. W. Wardle	do.
Alterations, &c. to the Lecture Hall, Hill-street, Lurgan	Presbyterian Church Committee	Young & Mackenzie	Sept. 27
Additions, &c. to St. Peter's Schools, Hindley, Lancs.	.....	H. Walls & Sons	do.
School, Pentrepoth	Carmarthen Sch. Bd	*Official*	do.
Unbroken Stone (800 tons)	Lytham (Lancs) U.D.C	do.	do.
*Laying-down 2,750 square yards Cement Flooring	Llanelly U.D.C.	G. Watkeys	Sept. 28
Club Premises, Alexandra-road	Penzance Club	O. Caldwell	do.
Drainage Works, East Runton, near Cromer	Erpingham D.C.	R. M. Parkinson	do.
*Fifty Seats for Cemetery	Middlesbrough Sanitary Committee	F. Baker	do.
*New School Buildings, &c.	West Hartlepool S. B.	E. P. Hinde	Sept. 30
Paving and Flagging Works, James-street	Harrogate Corp.	S. Stead	do.
Flint Road Metal	Wilton (Wilts) R.D.C.	J. Goulden	do.
Guernsey Granite Kerb (10,000 ft.) and Road Metal	Sittingbourne D.C.	*Official*	do.
Reservoir and Mains, Wingate, Durham	District Water Co.	do.	do.
Road Metal	Thakeham (Sussex) R.D.C.	do.	do.
*Supply of Firewood	Epsom Union	do.	Oct. 1
Sewerage Works (950 yds.), Ormskirk, Lancs.	Lathom & Burscough U.D.C.	Wood & Brodie	do.
Boiler House, Copley Mills, Halifax	.....	A. G. Dalzell	do.
Additions to Asylum, Enniscorthy	Lunacy Commrs.	C. A. Owen	Oct. 2
Schools, Cefnpennar, Mountain Ash, Glam.	Llanwonno Sch. Bd.	M. Morgan	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Paving Back, Hainingwood-terrace, Bill Quay, Northumberland	Felling U.D.C.	H. Miller	Oct.
*Alterations at Workhouse	Kensington Guardians	T. W. Aldwinckle	Oct.
Nine Houses, Letterston	North Pembrokeshire and Fishguard Ry. Co.	D. E. Thomas	do.
*Sanitary Work at Forest Gate School	Forest Gate School District	G. E. Holman	do.
*New Skylights to Market	Abergavenny U.D.C.	*Official*	do.
*Road-making and Sewer Works	Hornsey U.D.C.	do.	do.
*Erection of Sixteen Coast Guard Houses	Admiralty Wks. Dept.	do.	Oct. 4
Press-house, Buildings, &c.	Cambridge Corp.	J. T. Wood	Oct. 7
*Main Sewerage Works	do.	do.	do.
Waterworks	Kells (Ireland) T.C.	J. H. H. Swiney	do.
*Supplying and Laying Pipes, Valves, Hydrants, &c.	Southampton Corp	W. Matthews	Oct.
Surveyor's Materials	do.	do.	do.
*New Class-rooms, &c. to School	Walthamstow Sch. Bd.	*Official*	do.
*Additions to Infirmary, &c.	Sheppey Union	W. L. Grant	Oct. 9
*Re-erection of Wall, &c. Clissold Park	London County Council	*Official*	do.
Quay Wall (254 feet)	Poole Town Council	John Elford	Oct. 10
*Granite Kerbing and Channelling	Barnet U.D.C.	W. H. Mansbridge	Oct. 12
*Indurable Slab Paving	do.	do.	do.
*Brick and Pipe Sewers, &c.	Llandudno U.D.C.	E. & P. Stephenson	Oct. 15
*Casual Wards	St. Pancras Guardians	A. & C. Harston	Oct. 17
*Manufacture of Bricks	Lancashire Asylums Board	.....	Oct. 28
Drain Pipes, &c.	Horsham U.D.C.	*Official*	Oct. 30
*Completion of Asylum, Cotford	The Committee	Giles, Gough & Trollope	Nov. 4
Water Storage Tank, with Mains, &c. Bury St. Edmunds	Thingoe Union	*Official*	No date
Conversion of Houses into Shops, Albert Bridge-road, Belfast	Rev. John Canner	J. J. McDonnell	do.
*Houses & Shops, South London	.....	E. Tompkins	do.
Excavation Works, and Walling, Sycamore-road	Nottingham Sch. Bd.	A. H. Goodall	do.
Two Cottages, and Additions to Shop, Wentworth-road, Penistone	Mrs. Hemingway	H. J. Brettoner	do.
Business Premises, The Thoroughfare, Woodbridge, Suffolk	Bacon, Cobbold, Tollemache & Co.	T. W. Cotman	do.
Parish Hall, North Ormesby, Middlesbrough	.....	R. Lofthouse & Son	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Clerk of the Works	Wandsworth Vestry	.....	Sept. 23
Clerk of Works, Haslingden	Rawtenstall & Bacup Joint Sewerage Com.	2*l.* 10*s.* per week	Sept. 28
Clerk of Works	Stratford-on-Avon Corp.	3*l.* 3*s.*	Sept. 30
*Clerk of the Works	Sittingbourne U.D.C.	.....	do.
*Assistant Surveyor	Hanley Corporation	120*l.*	Oct. 7

Those marked with an asterisk (*) are advertised in this Number. Contracts, pp. iv., vi., *and* viii. *Public Appointments, pp.* xviii. *and* xx.

unions making returns has fallen from 2·4 in July to 1·8 in August, compared with 3·4 in August, 1894. Five new disputes in the trades occurred last month, but they do not appear to be important. The London bricklayers, carpenters, plumbers, and mill-sawyers, describe employment as good; the plasterers, painters, masons, and stone-carvers as fair. In the Tyne and Wear district, factory-coopers are working short time, with 15 per cent. unemployed. A decline in the building trades is reported from Macclesfield, though on the whole there is nothing to complain of. In Liverpool, painters are slack, but joiners well employed. Most of the quarrymen in Derbyshire are working short time, and there is no improvement in the stone trade in the area; on the other hand, very few builders are unemployed. The building trade throughout the Potteries, and at Leek, is only moderate, though the brick and tile yards are in full work. At Ipswich the stone-masons are slack, and the painters dull, at Colchester the bricklayers report employment as not very brisk, but other branches of the building trades in Suffolk and Essex are good. Plymouth and South-Western district reports the trades as fairly well employed, but quiet at Exeter and Torquay, and in most parts of Cornwall. Sett-makers in the Aberdeen district have obtained a temporary rise in wages on one class of work; and in Ireland the trade in general is good, building operations being especially brisk at Drogheda and Curragh. The activity of the building trades in Belgium is such that considerable difficulty is experienced in finding enough men to do the work to enable contracts to be completed in time.

BRICKLAYERS' STRIKE, RUGBY.—The *Rugby Advertiser* states that the strike of bricklayers in that town does not appear to have seriously interfered with building operations, which have gone on steadily through the summer. At the present time between twenty and thirty men are engaged in erecting the first batch of sixty cottages intended to be built in the vicinity of Worcester-street and Newbold-road, and new men are not difficult to get.

MEETINGS.

FRIDAY, SEPTEMBER 20.

Sanitary Institute (*Lectures for Sanitary Officers*).—Mr. J. Castell-Evans, F.I.C., on "Elementary Physics and Chemistry: the Chemistry of Fuel, and Combustion." V. 8 p.m.

SATURDAY, SEPTEMBER 21.

Northern Architectural Association.—Visit to Messrs. Swan & Hunter's, Wallsend.

Liverpool Engineering Society.—Excursion to the Wirral Railway Works, Sir D. Fox, Chief Engineer.

TUESDAY, SEPTEMBER 24.

Sanitary Institute (*Lectures for Sanitary Officers*).—Mr. J. Castell-Evans, F.I.C., on "Elementary Physics and Chemistry: Sanitary Chemistry." VI. 8 p.m.

WEDNESDAY, SEPTEMBER 25.

Sanitary Institute.—Inspection and Demonstration in the Parish of St. George's, Hanover-square, by Mr. Albert Taylor. 2 p.m.

Builders' Foremen and Clerks' of Works Association.—Quarterly Meeting of the Directors. 8 p.m.

THURSDAY, SEPTEMBER 26.

Sanitary Institute (*Lectures for Sanitary Officers*).—Dr. Louis Parkes on "Ventilation, Warming, and Lighting." 8 p.m.

SATURDAY, SEPTEMBER 28.

Architectural Association.—Visit to Wickham Hall. Leave Cannon-street Station 2.18 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

16,458.—WINDOWS: *R. Frame.*—Relates to windows which are hinged at one side, so as to open inwards for cleaning purposes. The upper sash is provided with hinges, having slots suitably arranged to engage with hook-shaped projections from the batten-rod and swing freely. The hinge on the lower sash has a loose flap with a projecting stud, which is arranged to enter a keyhole slot, formed in a plate secured to the side stile, and the loose flap is by this means turned into a hinged support on which the lower sash is swung open. Other modifications are mentioned, amongst them an angled handle on the sash-fastener for guiding the blinds over the lower sash.

18,693.—CHIMNEY-POT: *J. Fielden.*—A chimney-pot constructed with a wider outlet than base, with suitable diagonal openings or louvres.

19,183.—LATHING: *E. Stimson.*—Consists of sheets of papier-maché or similar material formed with holes, thickened round the edges and bevelled, so as to form a dove-tailed hold for the plaster.

5,477.—FIRE-GRATES: *C. Corbitt.*—A kind of double frame or basket arrangement for placing inside fire-places as fuel-holders. Consists of two halves which are hinged and rest on suitable supports, the halves being free to move outwards until they come in contact with the front and back of the fireplace.

8,612.—DOOR-SPRINGS: *P. Ayton.*—Deals with methods of arranging combined door-springs and checks. The check is of the pneumatic order, with the usual piston and cylinder, and the claim relates to the coupling of the outer end of the levering arm and piston-rod end to the door, through the medium of a link or pair of links.

12,957.—BRICKS: *H. Wood.*—Pertains chiefly to bricks for building purposes, but also has reference to paving blocks, tiles, &c. Gives details for the manufacture of these articles by mixing burnt ballast or other material of a gritty nature, with cement, and compressing the mixture, when in a powdered, slightly damp state, into the required shapes.

12,960.—DRAINAGE: *W. Downey.*—This invention is intended to provide a better drainage system for stables. The floor of each stall is made concave and covered with an impervious material; a trap being placed at the lowest point with suitable connexions to a sewer. A series of stalls may be arranged on different floors, with air-shafts formed between the stalls in each story of the building.

13,324.—BRICKS: *T. Southgate and another.*—An improved form of brick for walls and facings. The edges of the bricks are made with flanges and recesses, suitably shaped to engage or overlap on the face of the wall and render the joints impervious to damp or moisture.

NEW APPLICATIONS FOR LETTERS PATENT.

SEPTEMBER 2.—16,375, A. Loftus, Chimneys.—16,382, J. Livingston, Weather-board or Draught-Excluder for Doors, &c.—16,384, T. Batty, Brushes used for Hanging Wall and Similar Papers.—16,398, K. Deneys, Pigments or Lakes suitable for the Manufacture of Wall Papers.—16,406, R. Markham, Saw Set for Mill Saws.—16,410, C. Douglas, Saws.—16,422, V. Kjeldson, Building Blocks or Bricks.

SEPTEMBER 3.—16,459, C. Schmidt, Water Closet and like Joint Connexions.

SEPTEMBER 4.—16,540, D. Smith, Hinges for Doors.—16,545, A. and T. Sabine, Sanitary Pipes, &c.—16,546, S. Meson, Syphon Cisterns or Water-Waste Preventers, &c.

SEPTEMBER 5.—16,594, F. and F. McGrah, Window Fastener.—16,602, C. Turnock, Combined Multiple Circular Saw-bench Expanding Top, Spindle and Cavity Fence.—16,604, G. Brookes, Locking of Window-Sashes.—16,656, J. Ross and A. Heiron, Paint, &c.—16,661, J. Thomlinson, Manufacture of Plaster, Cement, Mortar, &c., from Chalk.—16,662, J. Parker and F. Bishop, of the firm of Marion & Co., Preventing the Picking of Door-locks.

SEPTEMBER 6.—16,666, S. Wilmot, Iron Lathing for Plaster Work.—16,671, E. Riley, Door-locks.—16,709, J. Jarvis, Sliding Window-sashes.—16,725, A. Perkins, Bricks.

SEPTEMBER 7.—16,747, J. Haywood and E. Thompson, Automatic Self-cleaning Splash and Stench Trap.—16,760, H. and A. Stevenson, Ornamental Surfaces for Decorative Purposes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,716, J. Hay, Wash-out Water-closet. — 15,393, S. Mason, Syphon-flushing Cisterns.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

16,988, M. Donne and C. Mathias, Self-closing Doors, Shutters, &c.—17,149, E. Nowell and others, Sash Windows.—19,787, J. Breeden & Co., Limited, and F. Breeden, Flushing Apparatus for Water-closets, &c.—19,933, M. McNamara, Flushing Cisterns.—20,279, E. Morton and H. Baden, Valve Water-closets. — 20,625, F. Brook, Jointing Stoneware or Earthenware Sewerage Pipes.—6,842, W. Howell, Band-Saw Guides.—14,744, S. Timings, Swing Joints or Pivots for Windows, Ventilators, &c.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

SEPT. 9.—By *E. J. Gilders:* Robinhood End Farm, Stambourne, &c., Essex, 2 cottages and 4 enclosures, 78 a. 0 r. 13 p., f., 615*l.*; an enclosure of land, 5 a. 2 r. 1 p., f., 90*l.*

SEPT. 10.—By *J. W. Morley & Letts:* 39, Bancroft-rd., Mile-end, u.t. 54 yrs., g.r. 4*l.*, e.r. 38*l.*, 410*l.*

SEPT. 11.—By *Montague Long:* 49, Clive-rd., Norwood, u.t. 221 yrs., g.r. 3*l.* 4s., r. 28*l.* 12s., 265*l.*; 17, 19, and 21, Woodcote-pl., f., r. 76*l.* 14s., 980*l.*; a plot of freehold building land, Woodcote-pl., 160*l.*; 2 and 3, Durham Villas, and a plot of bldg. land adjoining, u.t. 67¾ yrs., g.r. 10*l.*, r. 46*l.* 16s., 310*l.*; 4 to 7, Durham Villas, u.t. 67¾ yrs., g.r. 16*l.*, r. 104*l.*, 750*l.*; a plot of freehold building land, Durham-rd., 175*l.*; 125, 127, 129, and 131, Knight's Hill-rd., u.t. 58 yrs., g.r. 10*l.*, r. 104*l.*, 1,030*l.*; 15 and 16, Esher-st., Kennington, u.t. 9¼ yrs., g.r. 6*l.*, r. 48*l.*, 130*l.*; 65 and 67, Trigon-rd., South Lambeth, f., r. 56*l.*, 870*l.*—By *Philip Stock:* 10 and 12, Clifton-cres., Old Kent-rd., u.t. 51 yrs., g.r. 13*l.*, tithe 7s. 10d., 250*l.*; 53 and 54, Victoria-rd., Fulham, 24, 26, 34 and 36, Bullow-rd., 1, 2 and 3, Peterborough Cottages, and "Peterborough Cottage," leasehold, sold privately.—By *F. C. Mander & Co.:* A plot of building land, Pownall-rd., Fulham, 80*l.*—By *Messrs. Spelman* (at Norwich): A freehold residence, St. Giles'-rd, Norwich, and a plot of building land adjoining, 3 r. 10 p., 2,300*l.*; 86, West Pottergate-st., and "Gothic Cottage," f., 530*l.*; 4 and 5, Wright's Bldngs., and a plot of land, adjoining, f., 340*l.*

SEPT. 12.—By *C. C. & T. Moore:* 39, Vansittart-rd., Forest Gate, f., 220*l.*; f.g.r. of 4*l.*, Field-rd., reversion in 87 yrs., 105*l.*; f.g.r. of 12*l.*, Odessa-rd., reversion in 87 yrs., 325*l.*; f.g.r. of 16*l.*, Vansittart-rd., reversion in 87 yrs., 420*l.*; five plots of building land, Cliff-rd., Leigh, Essex, f., 120*l.*; 204, Leyton-rd., Stratford, f., 210*l.*; 74, Buxton-rd., f., 230*l.*; 2, Prestage-st., Poplar, f., 265*l.*—By *Cane & Co.:* 106, Barry-rd., Duiwich, u.t. 80 yrs, g.r. 6*l.*, e.r. 36*l.*, 310*l.*—By *Long & Linton:* 527, Kingsland-rd., Kingsland, u.t. 11½ yrs., g.r. 10s., r. 90*l.*, 490*l.*

SEPT. 13.—By *F. J. Bisley & Sons:* 71, Abbeyfield-rd., Rotherhithe, u.t. 59 yrs., g.r. 5*l.*, 300*l.*; 8 and 10, Catlin-st., Bermondsey, u.t. 52 yrs., g.r. 10*l.*, 430*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent, r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	8/0/0	9/0/0
Teak, E.I. ..load	10/0/0	16/0/0
Sequoia, U.S. ft. cu	1/10	2/2
Ash, Canada load	3/0/0	4/5/0
Birch, do.	2/0/0	3/5/0
Elm, do.	3/15/0	5/0/0
Fir, Dantsic, &c.	2/0/0	3/10/0
Oak, do.	2/15/0	4/15/0
Canada	6/5/0	7/15/0
Pine, Canada red	0/0/0	0/0/0
Do. Yellow	2/10/0	4/15/0
Lath, Dantsic, fath	4/10/0	5/10/0
St. Petersburg..	5/0/0	6/10/0
Wainscot, Riga, &c., log	2/15/0	5/0/0
Odessa, crown....	2/15/0	5/0/0
Deals, Finland 2nd & 1st std 100	7/0/0	8/10/0
Do. 4th & 3rd ..	7/0/0	8/0/0
Do. Riga	7/0/0	8/0/0
St. Petersburg, 1st yellow ...	9/10/0	12/0/0
Do. 2nd yellow	7/10/0	9/0/0
Do. white	8/0/0	9/10/0
Swedish	7/0/0	15/10/0
White Sea.....	7/5/0	14/0/0
Canada, Pine 1st	21/0/0	24/0/0
Do. do. 2nd.....	16/0/0	17/0/0
Do. do. 3rd, &c.	8/0/0	10/0/0
Do. Spruce, 1st..	9/0/0	10/10/0
Do. do. 3rd and 2nd	6/10/0	7/10/0
New Brunswick	6/0/0	7/0/0
Battens, all kinds	5/0/0	21/0/0
Flooring boards, sq., 1 in. prep. 1st.....	0/9/6	0/14/6
Do. 2nd	0/6/6	0/11/6
Other qualities—	0/4/6	0/7/6
Cedar, Cuba ..ft.	/3	/4
Honduras, &c.	/3	/4½
Mahogany, Cuba	/3	/6
St. Domingo, cargo av.	/3	1/0
Mexican do. do.	/3	/4
Tobasco do. do.	/3½	/6
Honduras do. ..	/3½	/5½
Box, Turkey ton	4/0/0	15/0/0
Rose, Rio	7/0/0	16/0/0
Bahia	6/0/0	15/0/0
Satin, St. Domingo	0/0/5	0/1/0

TIMBER (*continued*).		
Satin, Porto Rico	0/0/6	0/1/6
Walnut, Italian....	0/0/3	0/0/7

METALS.		
Iron—Pig, in Scotland .....ton	2/7/10	c/0/2
Bar, Welsh, in London	5/12/6	5/15/0
Do. do. at works in Wales.....	5/2/6	5/5/0
Do. Staffordshire, in London.....	6/0/0	6/10/0
COPPER—British cake and ingot	50/5/0	50/10/0
Best selected ..	51/0/0	51/5/0
Sheets, strong..	57/0/0	0/0/0
Chili bars	46/13/9	46/18/9
YELLOW M'TAL	0/0/4 9-16	0/0/4⅝
LEAD—Pig, Spanish ....ton	10/16/3	0/0/0
English com. brands	11/0/0	0/0/0
Sheet, English, 6 lbs. per sq. ft. and upwards ..	12/0/0	12 2 6
Pipe	12/10/0	0/0/0
ZINC—English sheet .....ton	18/5/0	0/0/0
Vieille Montagne	18/15/0	0/0/0
TIN—Straits.....	65/7/6	65/17/6
Australian.....	66/12/6	67/2/6
English Ingots.	67/15/0	68/0/0
Banca	66/10/0	67/0/0
Billiton	65/5/0	65/15/0

OILS.		
Linseed .....ton	20/7/6	20/17/6
Cocoanut, Cochin	24/0/0	0/0/0
Do. Ceylon	23/0/0	23/5/0
Palm, Lagos	23/0/0	0/0/0
Rapeseed, English pale	22/0/0	0/0/0
Do. brown	20/10/0	20/15/0
Cottonseed ref. .	17/5/0	17/15/0
Oleine.....	20/10/0	21/10/0
Lubricating, U.S.	5/9/0	8/3/0
Do. black	4/6/0	6/6/0
TAR—Stockholm barrel	0/19/6	0/0/0
Archangel.....	0/14/6	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

ABERGAVENNY.—For the erection of villa residence, &c., Stanhope Park Estate, for Mr. Jno. Wilson. Mr. E. A. Johnson, architect, St. Mary's Chambers, Abergavenny. Quantities by architect:—

H. Smith	£1,447	0	
Bowen & Co.....	1,313	0	
Hatherley & Carr	1,275	10	
J. G. Thomas, Abergavenny*	£1,240	10	

* Accepted.

BARNSLEY.—Accepted for pulling down buildings and erecting warehouse, Mayday Green, for Mr. John Porter. Mr. R. Dixon, architect, 5, Eastgate, Barnsley:—

Masonry.—Mellor & Moorhouse, Pindar Oaks, Barnsley.....	£140 0
Joinery.—Wm. Dyson, Kingstone-place, Barnsley..	99 0
Plumbing.—J. Snowden & Son, Market-street, Barnsley.....	45 10
Slating.—Thornton Bros., Bradford	26 15
Painting.—E. R. Fletcher, Church-street, Barnsley	7 0
Ironfounding.—Kenworthy, Taylor & Co., Wellington-street, Barnsley	45 0

BRIDGEND (Glam.).—For the erection of a church, Maesteg, for the Rev. S. Jackson and Building Committee. Mr. G. E. Halliday, architect, 14, High-street, Cardiff. Quantities by Mr. John W. Rodger, 14, High-street, Cardiff:—

A. J. Howell & Co.	£6,256	15	3
D. C. Jones & Co...	5,341	0	0
H. Willcock & Co.	5,275	0	0
P. Gaylard	5,225	15	0
W. McGaul, Bridgend*.....	£5,140	0	11
W. Lissaman, jun...	5,110	0	0

* Accepted.

BROMLEY (Kent).—For additions to Lynton House, for Mr. Daniel Grinsted. Messrs. Wadmore, Wadmore, & Mallett, architects, 35, Great St. Helen's, E.C.:—

Arnaud & Son	£927		
Crossley & Son	864		
T. D. Graty	833		
F. P. Duthoit	£820		
D. Payne (accepted)	820		

[All of Bromley.]

BUCKIE (N.B.).—For additional water-supply works to the town, also sewer extensions, &c., for the Town Council. Mr. John Chisholm, C.E., Borough Surveyor, Buckie. Quantities by Mr. John Chisholm, C.E.:—

A. Pirie	£1,357	16	3
Geo. Shanks	1,184	5	4
J. & T. Campbell ..	1,153	2	0
Chas. Stewart	1,108	13	4
John Barclay .....*	£1,099	13	0
W. Beveridge, Cullen*.....	1,088	17	0

* Accepted.

CARRICK-ON-SUIR (Ireland).—Accepted for the erection of nine cottages, &c., for the Union Guardians. Mr. P. Wilkinson, architect:—

Peter Wilkinson, Palace End ....£126 each for six cottages.

DARTFORD.—For the execution of certain building works, Southfield House, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C.:—

W. Johnson & Co. .....*	£298	0	
C. Miskin	267	0	
T. T. Barden.....	226	0	
E. Mills	£225	0	
M. Batchelor (accepted).	215	12	

EPSOM.—For the execution of repairs and sanitary work in connexion with a cooling-house, Horton Farm. Mr. A. Parnacott, surveyor, 93, York-road, London, S.E.:—

Peacock Bros.....*	£248	10	0
Reed	£236	15	6

GRAVESEND.—For the erection of Municipal Offices for the Town Council. Mr. A. G. Smith, architect, 1, Darnley-street, Gravesend. Quantities by Mr. W. Hawker, of Gravesend and London:—

R. Avard	£2,189		
T. White & Son.....	2,060		
W. P. Goose.....	1,979		
E. Proctor.....	1,920		
W. H. Rayfield	1,919		
Multon & Wallis	£1,869		
G. Gates	1,850		
H. W. Martin, Gravesend*	1,700		
J. S. Trueman.....	1,482		

* Reduced to £1,387, and accepted.

JOHNSHAVEN (N.B.).—Accepted for additions to the public school buildings, for the School Board. Mr. John Sim, architect, 160, High-street, Montrose:—

Building.—J. Hunter & Co., Johnshaven	£112	0	0
Joinery.—D. Anderson, Johnshaven	78	7	6
Plumbing.—R. & W. Peter, Bervie	9	16	0
Plastering.—A. Clark, Berne.....	9	1	3
Slating.—C. Brand, Dock, Montrose	12	0	0

LEICESTER.—For the erection of technical and art schools, the Newarke, for the Corporation. Messrs. Everard & Pick, architects, 6, Millstone-lane, Leicester:—

Parnell & Son	£27,155		
S. F. Halliday	24,050		
Hutchinson & Son	24,034		
H. T. & W. Chambers ..	23,978		
Kellett & Son	23,965		
Thoday & Co.	23 964		
S. Briers	£23,950		
Clark & Garrett	23 842		
Hardington & Elliott....	23,726		
T. & H. Herbert	23,467		
Huison Bros.	23,450		
Johnson & Son	23,290		

LISCARD (Cheshire).—Accepted for additions to the administrative block, Mill-lane Hospital, for the Wallasey Urban District Council. Mr. Arthur Salmon, C.E., Public Offices, Egremont:—

McLacklan & Batkin, Birkenhead.....£258 18

LONDON.—Additions, &c., to "Buecker's" Hotel, Finsbury-square, E.C., for Mr. Gustave Hohly. Mr. John Groom, architect. Quantities by Mr. Henry Theobald, surveyor, 48, Finsbury-pavement, E.C.:—

E. Lawrence & Sons ....*	£5,370		
Stimpson & Co.	5,340		
Woodward & Co.	5,300		
Mattock Bros.....	£5,177		
H. L. Holloway.....	5,100		
Kilby & Gayford*.....	4,930		

* Accepted.

LONDON.—For the execution of structural alterations, drainage works, &c., Nos. 27 and 29, Moorgate-street, E.C. Mr. Howard Chatfeild Clarke, architect, 63, Bishopsgate-street, Within, E.C.:—

Ashby & Horner	£2,798		
C. Lawrance & Sons	2,640		
Clarke & Bracey	2,530		
Coll & Sons	£2,510		
Hall, Beddall, & Co.*	2,420		

* Accepted.

LONDON.—Accepted for the erection of workshops, also alterations and additions to two blocks, at the workhouse, King's-road, for the St. Pancras Union Guardians. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities by Messrs. Corderoy, Selby, & Corderoy, and Mr. W. F. Farthing:—

McCormick & Sons £11,785 11 7

LONDON.—For the erection of part of a church, also premises, Quex-road, Kilburn. Mr. Howard Chatfeild Clarke, architect, 63, Bishopsgate-street Within, E.C.:—

J. & H. Cocks.....*	£1,985		
T. Boyce	1,448		
C. L. Nunn	1,442		
Mattock Bros.....	1,419		
McCormick & Sons	£1,376		
C. Lawrence & Sons	1,398		
Killby & Gayford *	1,282		

* Accepted.

LONDON.—Accepted for pulling down and rebuilding "The King's Head" public-house, and Nos. 7 and 8, King-street, Gravesend, for Mr. George Matthews Arnold. Mr. A. G. Smith, architect, Gravesend:—

W. H. Archer, The Grove, Gravesend £2,800

LONDON.—For additions to school buildings, Milton-road, for the Gravesend School Board. Mr. A. G. Smith, architect, Gravesend:—

H. W. Martin .....*	£498		
T. De Wardt	451		
W. Tuffee*	£419		
W. J. Wyatt	385		

[All of Gravesend.]

* Accepted on conditions.

LONDON.—For the erection of two two-story wards and workshops at the South-Eastern Hospital, for the Metropolitan Asylums Board:—

T. Boyce .....*	£22,340		
C. Wall	22,300		
Shillitoe & Sons	22,100		
Godson & Sons	21,492		
Perry & Co.	21,100		
W. Wallis	21,000		
Wallis & Sons .....*	£20,200		
J. & F. Higgs	20,050		
W. Johnson & Co., Wandsworth Common, S.W. (accepted)	19,870		
Kirk & Randall.....	19,720		

LUNDY ISLAND (Bristol Channel).—For the erection of St. Helen's Church. Mr. Jno. Norton, architect, 95, Ridgmount-gardens, W.C. Quantities by Mr. Pinn, of Exeter:—

Trask & Sons .....*	£3,199	0	0
Wiffen.....	3,048	0	0
Britton & Pickett, Ilfracombe* .....*	£2,861	12	6

* Accepted.

MANCHESTER.—For the execution of sewerage works, &c., Taylor's-road and others, Stretford, for the Trustees of Sir H. F. de Trafford, Bart. Mr. John Bowden, C.E., surveyor, 14, Ridgefield, Manchester:—

Wm. Barton .....*	£3,350	0	0
J. & J. Lee	3,331	16	4
J. E. Nadin	2,642	16	4
Thos. Kilburn	2,627	0	0
Pickthall & Pickthall	2,531	0	0
Jas. Hamilton	2,505	0	0
J. D. Nowell.....*	£2,483	6	4
Etheridge & Clark..	2,392	18	3
Geo. Bozson.....	2,390	0	0
M. Naylor & Sons ..	2,150	0	0
W. Snape & Sons, Eccles (accepted) .	2,054	18	

MITCHAM.—For laying on water, sanitary works, and asphalting, Singlegate schools, for the Mitcham School Board. Mr. Robert M. Chant, Croydon and Mitcham, architect:—

	Contract No. 1. Drainage.	Contract No. 2. Sanitary Works.	Contract No. 3. Asphalting.
E. J. Burnand .....*	£201 10	£626 10	£79
J. Burges*	197 0	628 0	72

* Accepted.

PONTYPRIDD.—For the completion of a church at Pontygwaith, for Mrs. Llewellyn. Mr. Geo. E. Halliday, architect, Cardiff. Quantities by Mr. John W. Rodger, Cardiff:—

Willcock & Co. .....*	£2,220		
Jenkins & Son.....	1,900		
Williams & Thomas	1,799		
Knox & Wells, Cardiff* ..	£1,755		
W. Lissaman, jun.	1,715		

* Accepted.

MORLEY (Yorks.).—For the erection of boiler-house and drying room, Tingley Mills. Mr. T. A. Buttery, architect, Morley :—

Masonry and Bricklaying.—George Ainsworth, Bridge-street, Morley	£165 0 0
Joinery.—N. Holroyd, Fountain-street, Morley..	22 0 0
Iron Roof.—J. Umpleby, Cleckheaton	28 0 0
Iron Floor.—S. & S. Clark, Batley	39 4 0
Slating.—Sharp & Harper, Whitehall-road, Leeds	12 14 0
Total	£264 18 0

Selected Tenders for Shed, Tingley Mills.

Masonry.—J. & J. Sugden, High-street, Morley.	£57 10 4
Joinery.—John Grayshur	48 11 6

STAMFORD.—For the construction of a cattle-market, St. Martin's. Mr. J. Richardson, Borough Surveyor, Stamford :—

J. W. Botterill	£7,470 0 0	W. T. Hall	£6,300 0 0
Lockerbie & Wilkinson	6,740 0 0	R. Finnegan	6,200 0 0
Siddons & Freeman	6,650 0 0	Roberts & Willocks.	6,200 0 0
Solden	6,625 0 0	J. H. Vickers	5,755 0 0
Sherwin	6,497 0 0	Francis Thoday & Co., Ltd.	5,728 0 0
Hinson Bros.	6,340 11 9	J. Woolston, Stamford*	5,530 0 0
J. E. Johnson & Son	6,340 0 0		

* Accepted.

SWINDON.—For the extension of St. Mark's Church. Mr. Temple Moore, architect, 39, Old Queen-street, Westminster, S.W. :—

G. Elms	£757 2 6	H. Hoskings	£593 0 0
T. Barrett	737 0 0	G. Wiltshire	559 17 9
Bottrill & Son	740 0 0	G. Brown	468 18 0
Downing & Rudman	664 0 0		

TOLLESBURY (Essex).—Accepted for additions to National School buildings. Mr. P. M. Beaumont, architect, Maldon :—

Girling & Cos, Ipswich	£621

TREORKY (Glam.).—For the erection of a church at Cwm Park, for Mrs. Llewellyn. Mr. George E. Halliday, architect, Cardiff. Quantities by Mr. Jno. W. Rodger, surveyor, 14, High-street, Cardiff :—

Jenkins & Son	£3,930	W. Lissaman, jun.	£3,630
E. Jones	3,918	Knox & Wells, Cardiff (accepted)	3,545
Wm. McGaul	3,862	H. Willcock & Co.	3,538
Williams & Thomas	3,785	J. D. Williams	3,400
D. C. Jones & Co.	3,742		

WOKINGHAM.—For the construction of a reservoir, Wargrave and Twyford, for the Rural District Council. Mr. R. W. Hamilton, surveyor, Glenthorne, Hamilton-road, Reading. Quantities by Mr. Arthur Marshall, engineer, Swadlincote :—

Thomas Pedretto	£1,375 0 0	W. Stokes	£1,062 19 7
M. S. Ketteringham	1,272 0 0	P. W. Symmons	1,050 19 0
Silver & Sons, Ltd.	1,271 7 2	W. Hawkins	1,047 13 6
Bottrell & Son	1,250 14 6	G. H. Gibson, High Wycombe*	1,022 0 0
G. Simonds	1,092 15 0		

* Accepted.

TO CORRESPONDENTS.

T. B. B., T. R. (too late for insertion).

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

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THE INDEX, with TITLE-PAGE, for Volume LXVIII. (Jan. to June, 1895) was given as a supplement with the number for July 13.

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Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the front Page should be in by TWELVE noon on WEDNESDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before 10 a.m. on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed), 1s.

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SLATE MERCHANT,

SLATER and TILER.

ESTIMATES GIVEN FOR

SLATING AND TILING,

To be Executed by Contract in any part of ENGLAND.

Penrhyn - Bangor,

Oakeley - Palmerston,

And other description of Slates ready for immediate delivery to any Railway Station.

Applications for Prices, &c., to

BETHNAL GREEN SLATE WORKS,

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THE BATH STONE FIRMS, Ltd.

BATH,

FOR ALL THE PROVED KINDS OF

BATH STONE.

FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.

The attention of Architects is specially invited to the durability and beautiful COLOUR of this material. Quarries well opened. Quick despatch guaranteed. Stonework delivered and fixed complete. Samples and estimates free. Address, The Ham Hill Stone Co., Norton, Stoke-under-Ham, Somerset. London Agent: Mr. E. A. Williams, 16, Craven-st., Strand, W.C. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co. [ADVT.

SPRAGUE & CO.,

LITHOGRAPHERS,

Employ a large and efficient Staff especially for Bills of Quantities, &c.

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QUANTITIES, &c., LITHOGRAPHED accurately and with despatch.

METCHIM & SON, 20, Parliament-st. S.W.

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For 1895 price 6d. post 7d. In leather 1/- Post 1/1 [ADVT.

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COMPANY,

Suffolk House, Cannon-street, E.C.

SUPPLY THE BEST MATERIAL AND WORKMANSHIP FOR BUILDINGS, DAMP COURSES, AREAS, ROOFS, WASHHOUSE AND DAIRY FLOORS, &c., &c.

This Asphalte was chosen to be laid at Sandringham, on the new General Post Office, and other important buildings.

TWELVE GOLD AND SILVER MEDALS AWARDED.

ZINC AND COPPER ROOFING.

F. BRABY & CO.

LONDON. ◆◆ LIVERPOOL. ◆◆ GLASGOW.

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NO SOLDER. NO EXTERNAL FASTENINGS.

Particulars on Application. Chief Offices: Fitzroy Works, EUSTON ROAD, LONDON, N.W.

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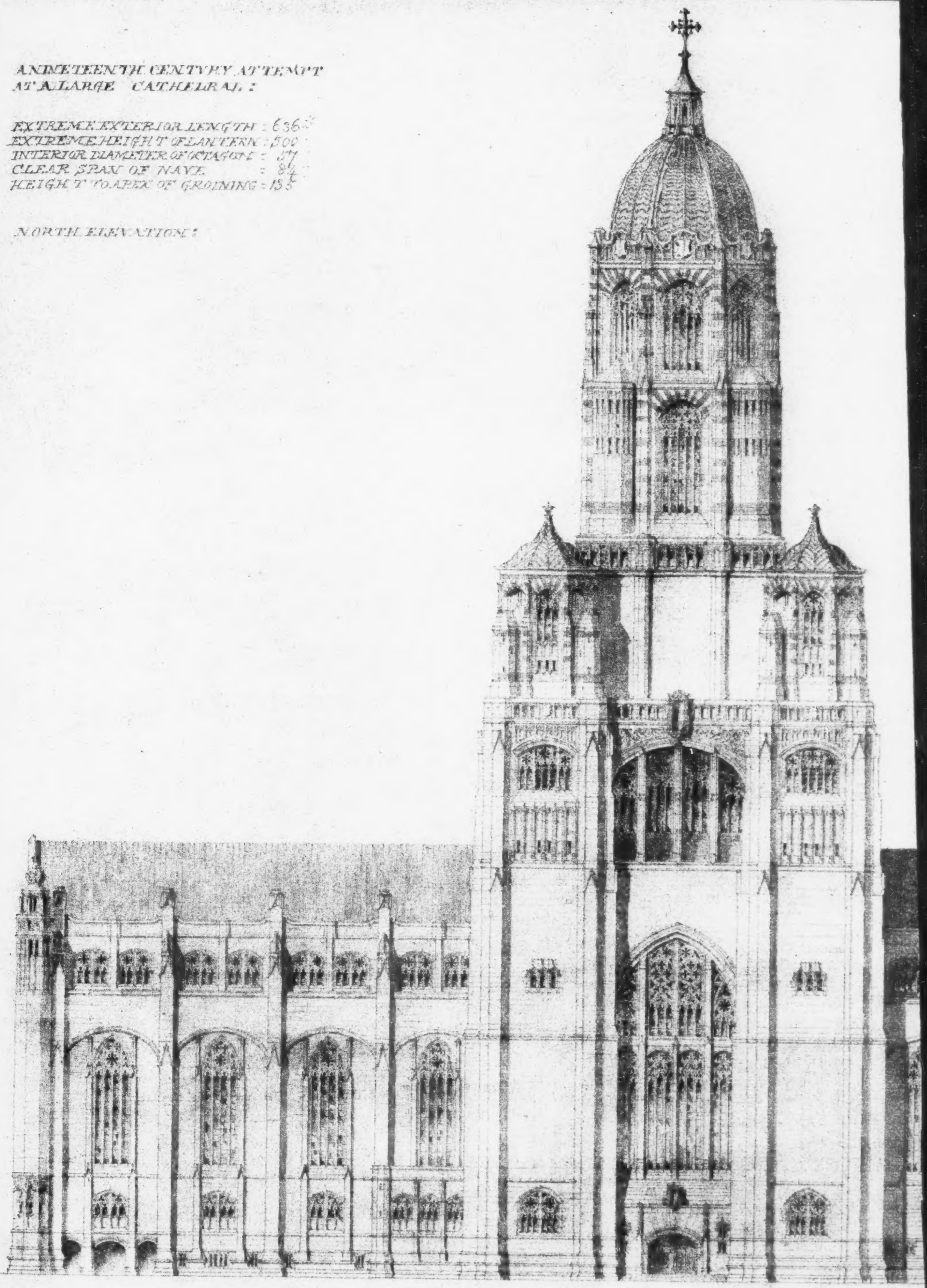
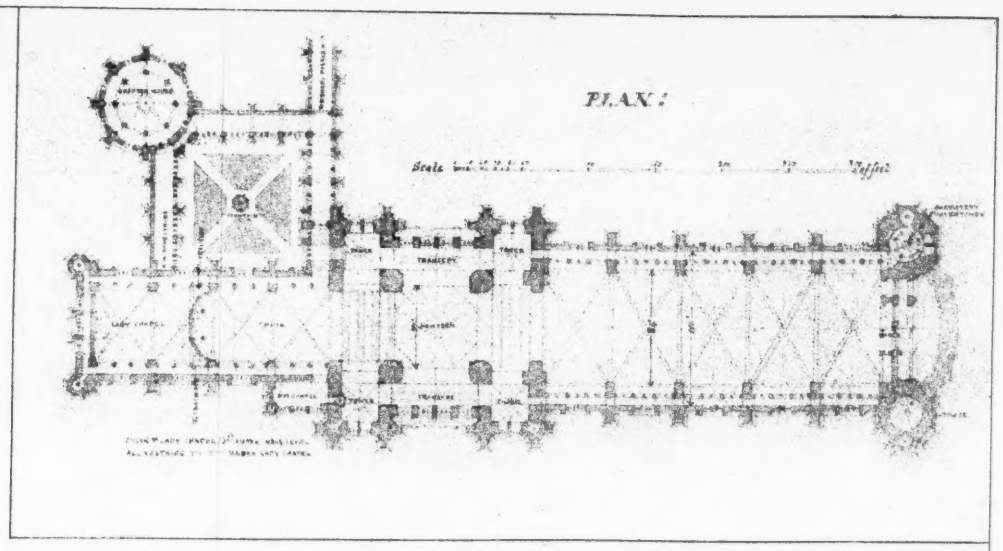
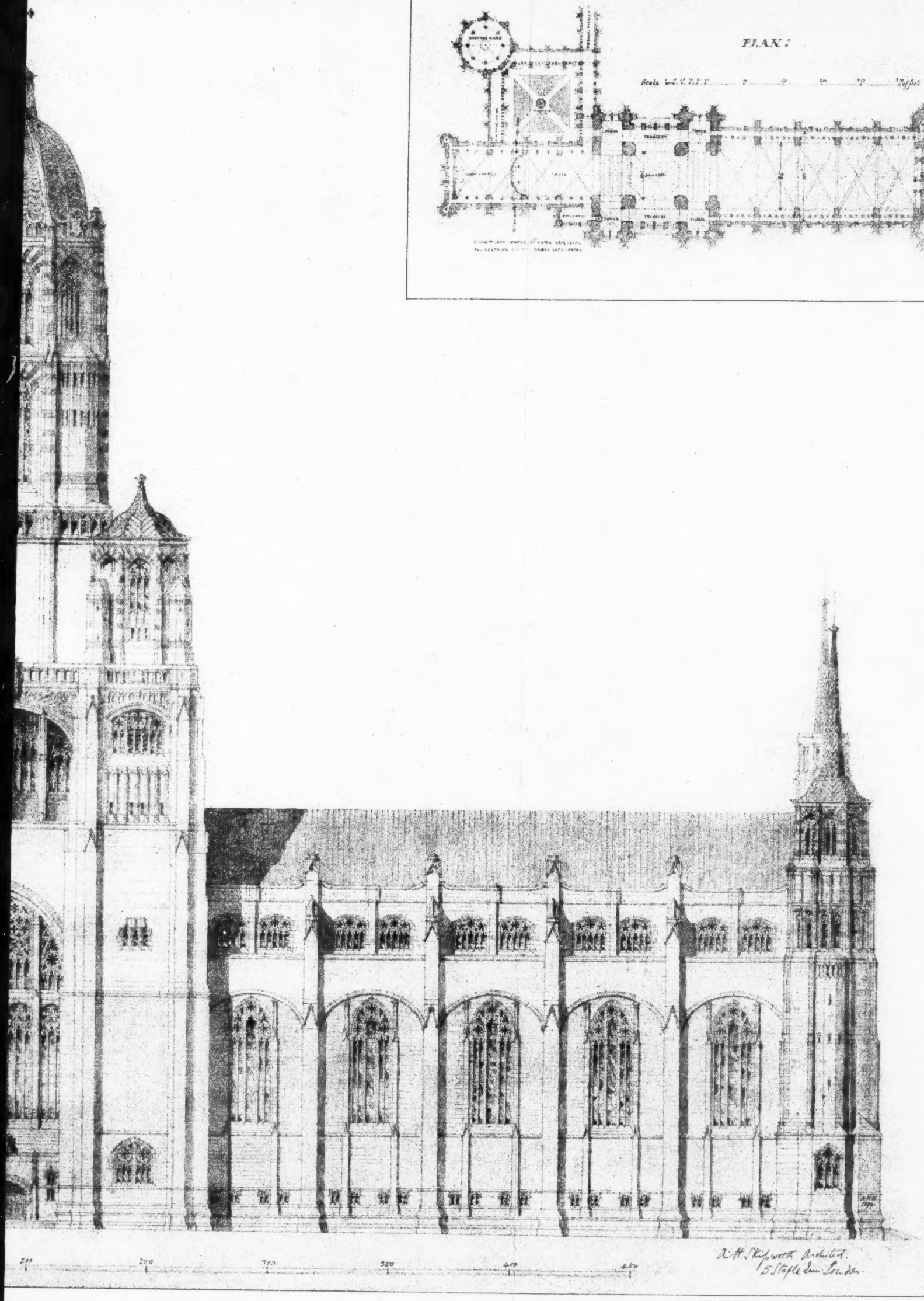
AN INETEENTH CENTVRY ATTEMPT
AT A LARGE CATHEDRAL :

EXTREME EXTERIOR LENGTH = 636'
EXTREME HEIGHT OF LANTERN = 300'
INTERIOR DIAMETER OF OCTAGON = 87'
CLEAR SPAN OF NAVE = 84'
HEIGHT TO APEX OF GROINING = 135'

NORTH ELEVATION :







R. H. Skidmore Architect.
15 Staple Inn. London.

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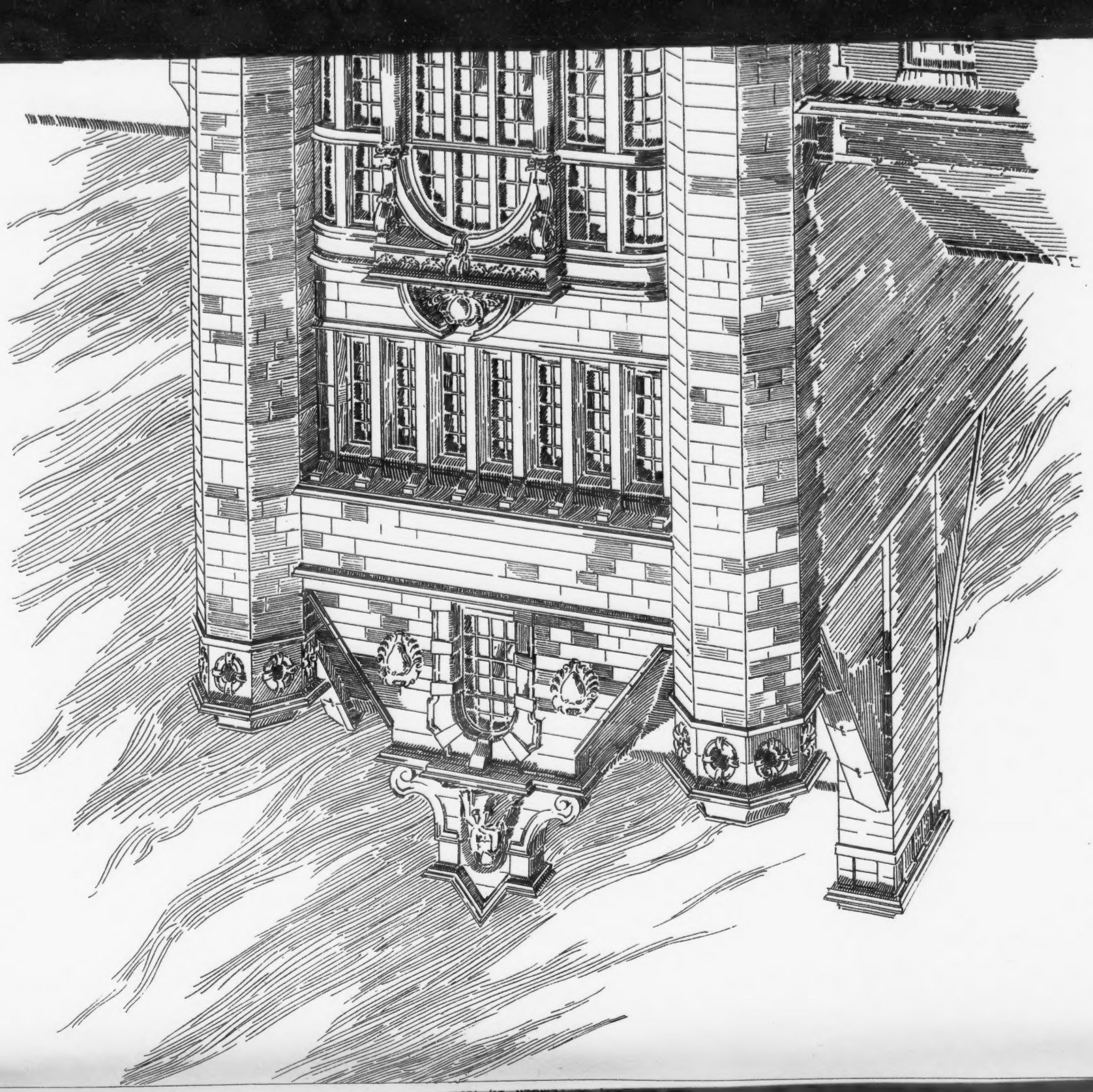

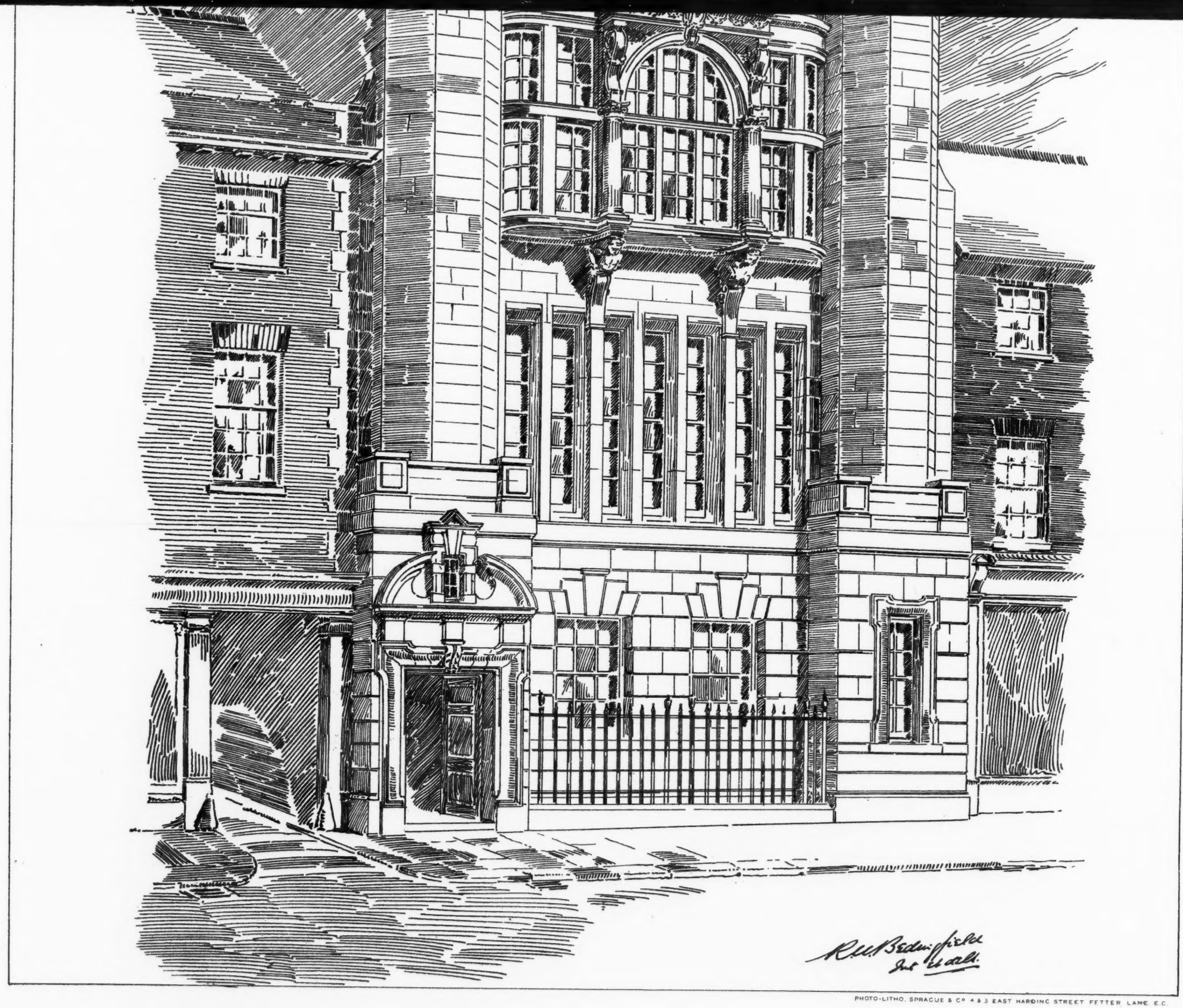

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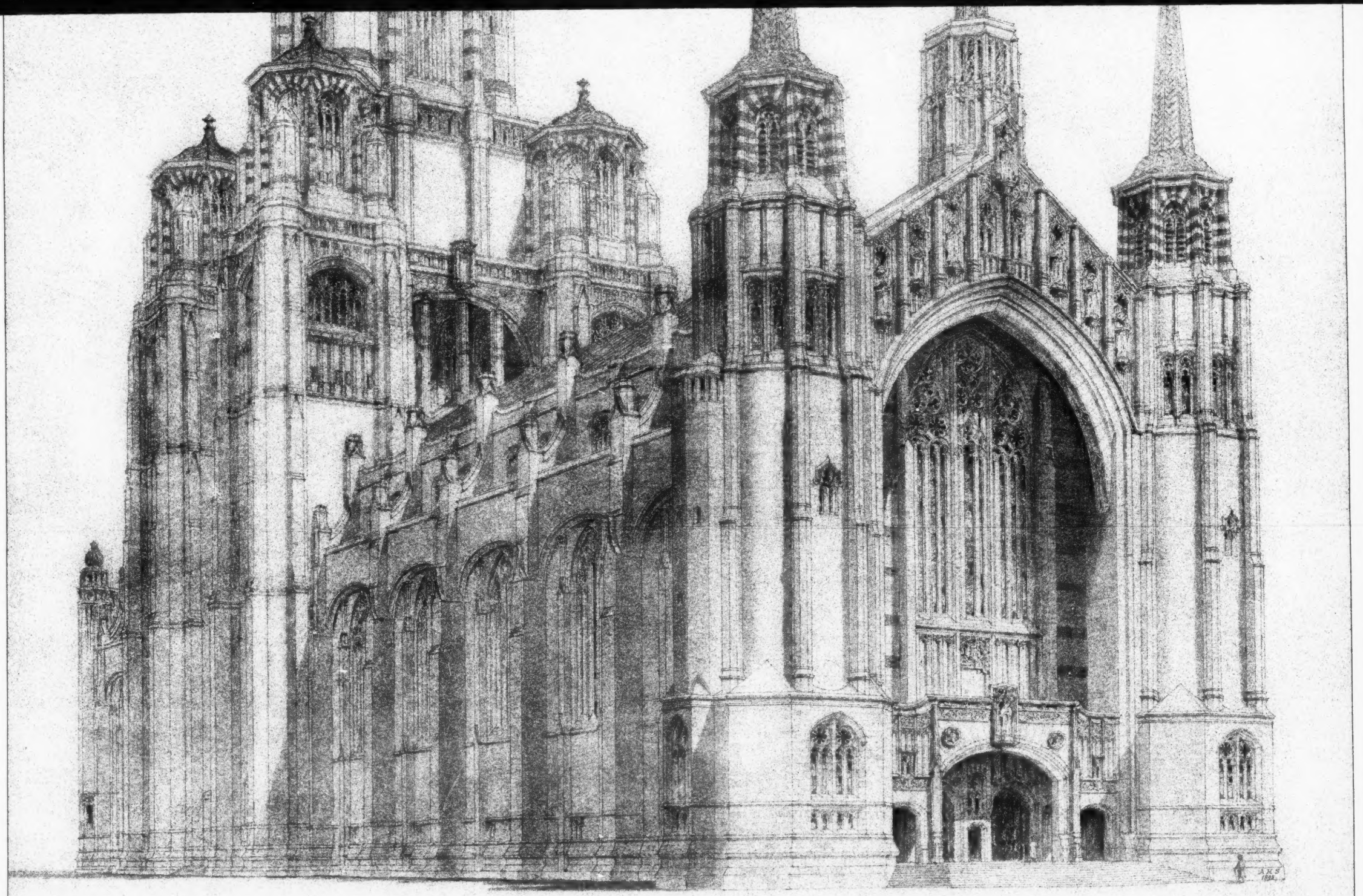
A STREET FRONT.—Mr. R. W. Bedingfield, A.R.I.B.A., Architect.

A NINETEENTH CENTURY ATTEMPT AT A LARGE CATHEDRAL

EXTREME INTERIOR LENGTH	696
EXTREME HEIGHT OF LANTERN	300
INTERIOR DIAMETR OF OCTAGON	57
CLEAR SPAN OF NAVE	84
HEIGHT TO APEX OF GROINING	135



VIEW FROM NORTH WEST

A.H. Skipworth Architect
5 Maple Place London W.C.

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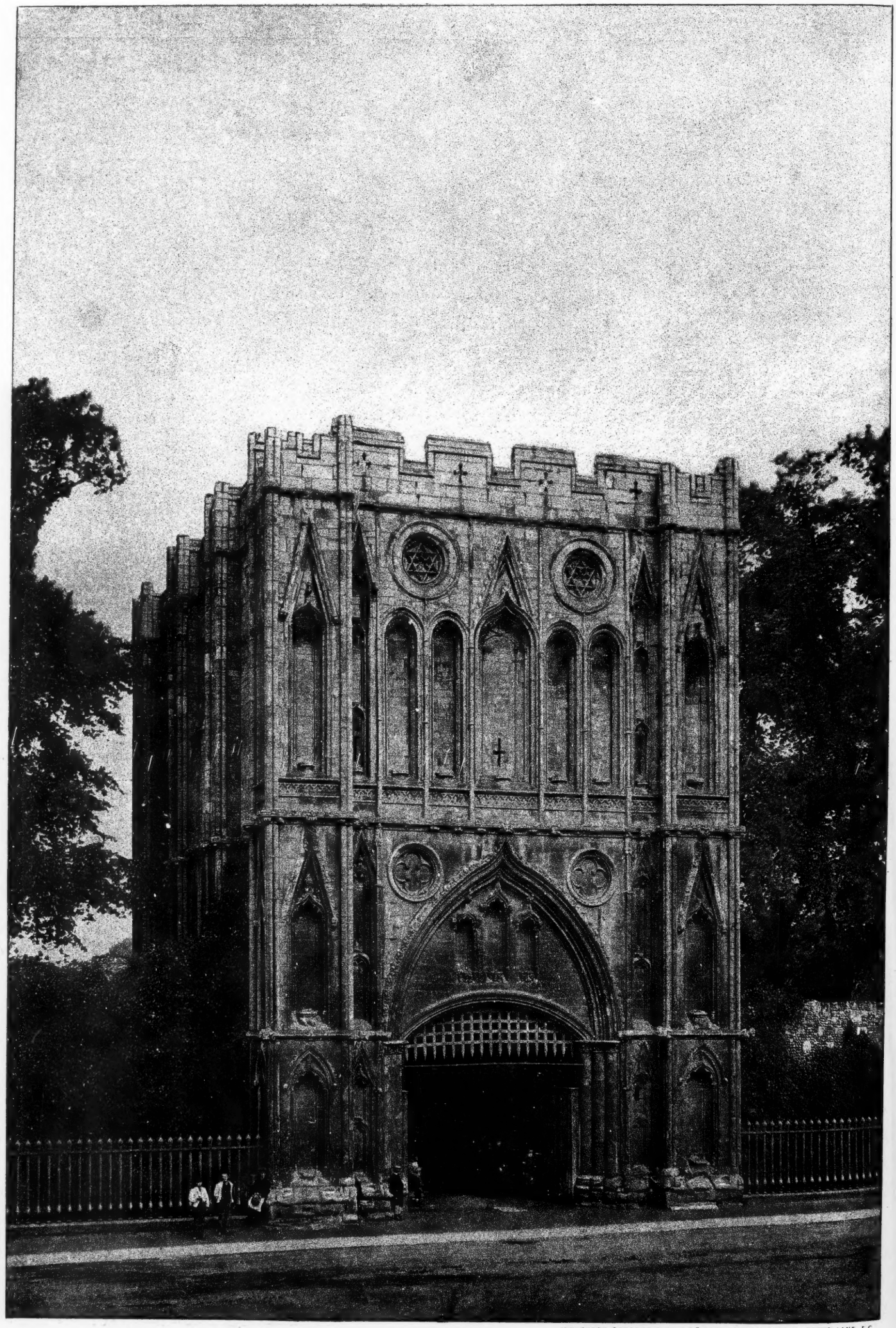

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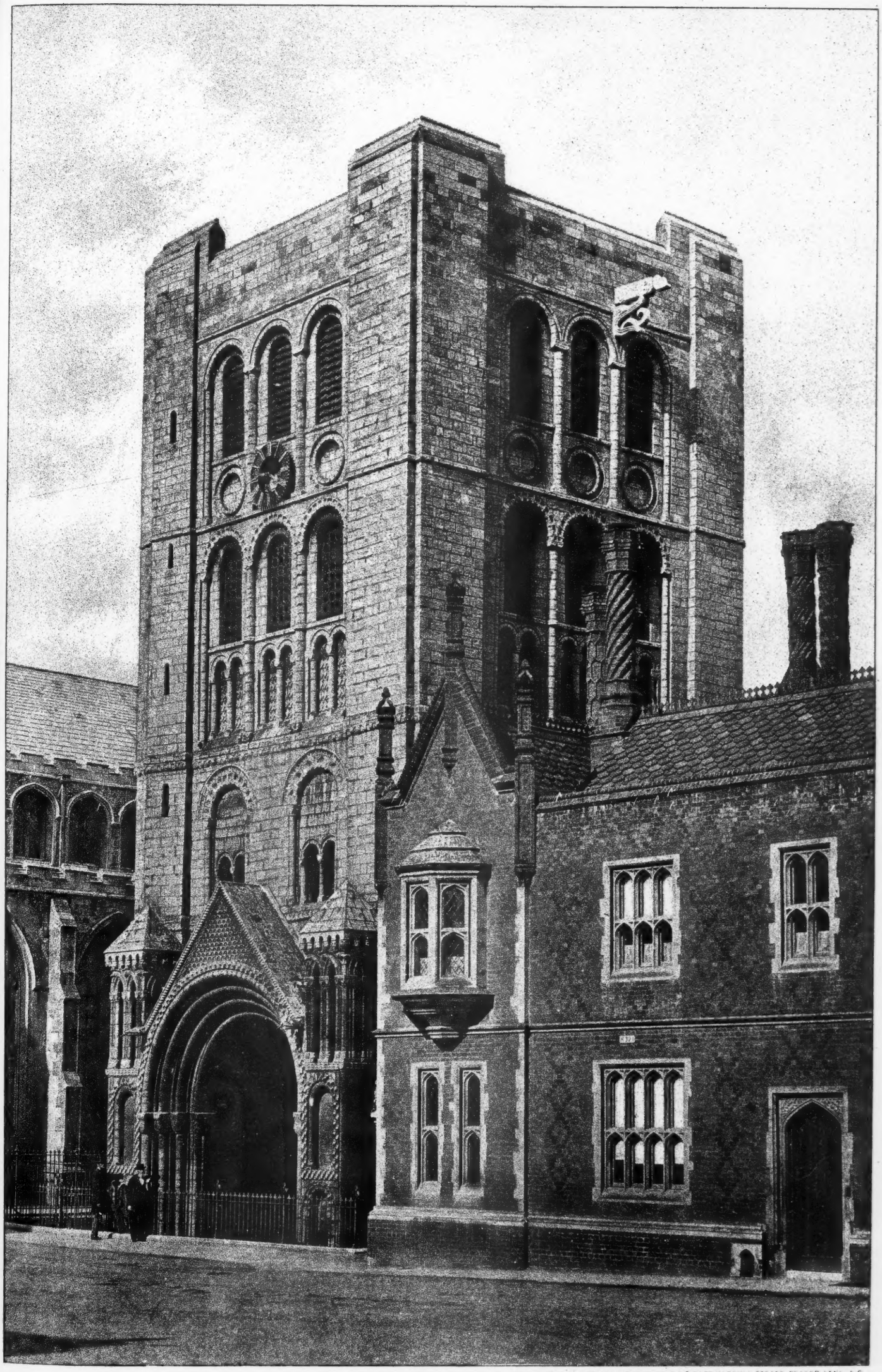
ABBEY GATE, BURY ST. EDMUNDS.



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NORMAN TOWER, BURY ST. EDMUNDS.